

Croplife

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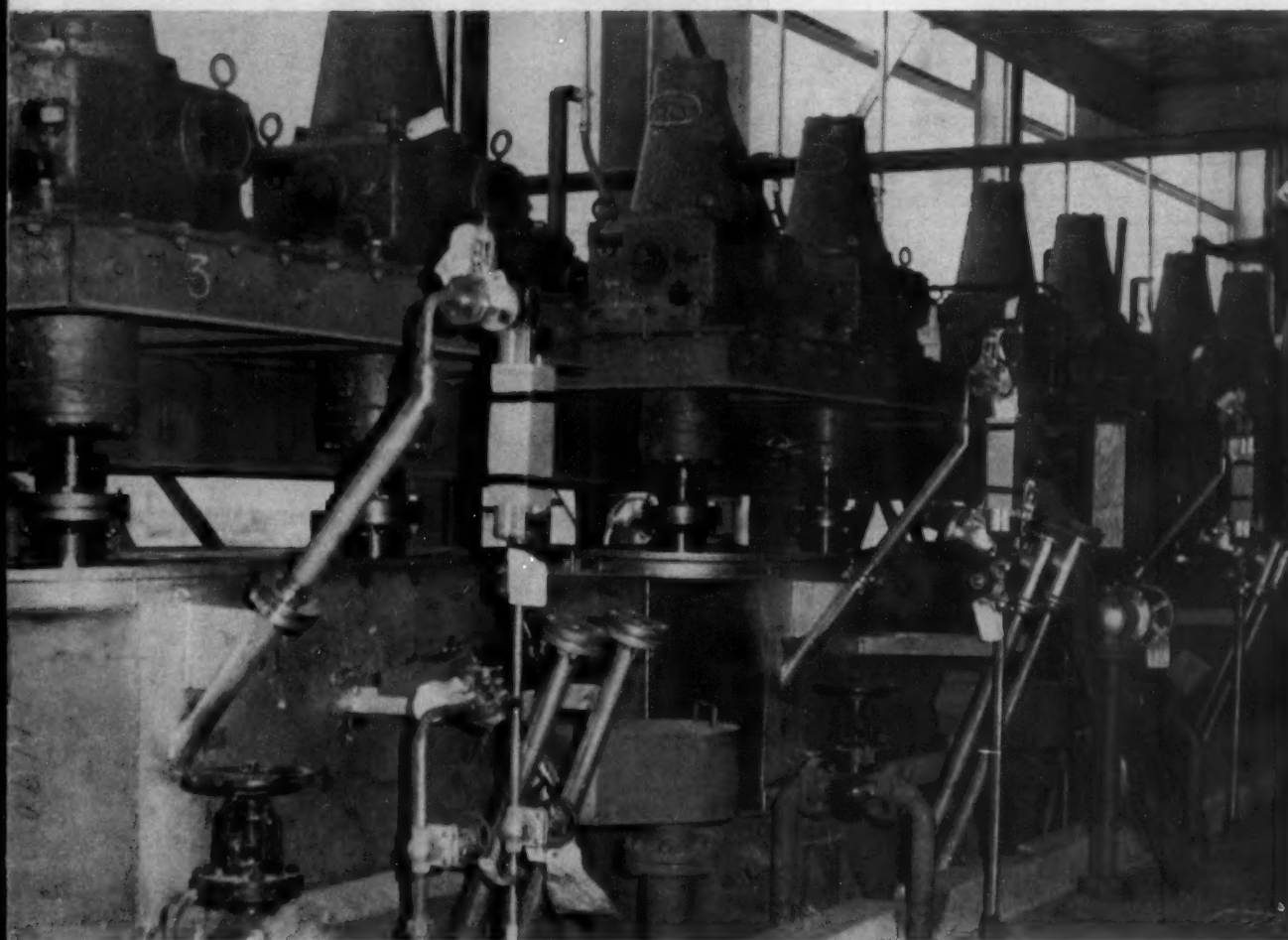
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APRIL 11, 1960

PRODUCTION

EDITION

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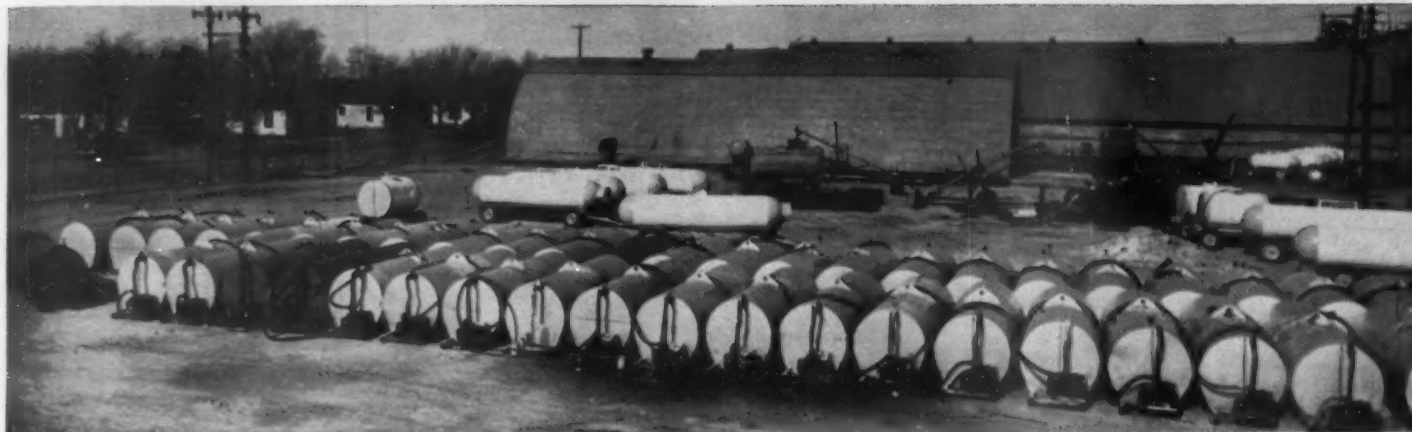


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REACTORS—Part of bank of reactors in new Calspray fertilizer plant at Kennewick, Wash. Story page 8, this issue.

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Accepted as Controlled Circulation



Increased Output Planned for 1960 by Texas Fertilizer Firm

DURING ITS FIRST year of operation the fertilizer division plant of the Goodpasture Grain & Milling Co., Brownfield, Texas, reached a capacity of 5,000 gallons of liquid fertilizer an hour. By the end of the season the new plant had used over 100 carloads of phosphoric acid.

"This year the total will be higher," said L. T. Stone, technical administrator, in charge of all production. "We have hopes of hitting a peak of 10,000 gallons per hour."

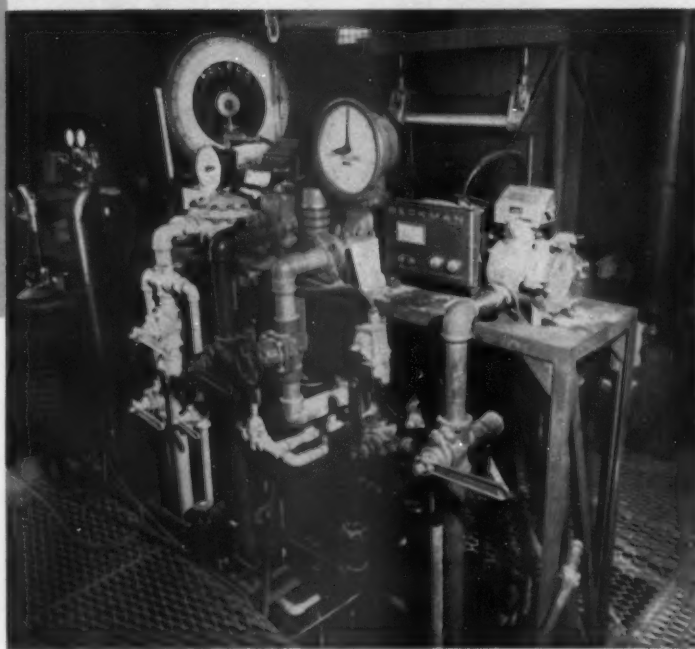
The plant was built in March of 1959 by Grady Goodpasture, president of the company, who has grain elevators throughout West Texas. Long interested in higher yields, both in cotton, and grain sorghum, he saw a need for a plant that would tailor its products to local conditions. He finally decided to build one of his own.

The plant makes liquid fertilizer only. Most popular mixtures are 13-

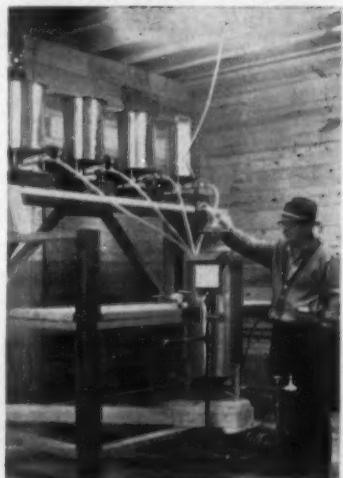
13-0, 10-15-5, 8-24-0 and 17-14-7. The potash mixtures were used because Mr. Stone came to believe the soils needed potash. So he formulated the mixtures, helped put on a sales campaign, and found that yields were higher where potash was applied.

"To find out what was needed, we set up a soils laboratory," he said, "and this winter have been running 500 samples a month. Our men take some of them, but we have trained many farmers to take their own. We get \$2 for analyzing each sample,

Turn to **TEXAS FIRM** page 30



FERTILIZER OPERATION—Top of page: Storage tanks at Goodpasture Fertilizer Co. are used to loan to farmers and dealers. At right is reactor. Capacity at plant is expected to reach 10,000 gal. an hour. At right: Donald Johnson, chemist, conducting soil test in company's laboratory. Lower photo: L. T. Stone, technical administrator, demonstrates pilot plant, a copy of TVA pilot plant. Model aids experiments with new formulations.



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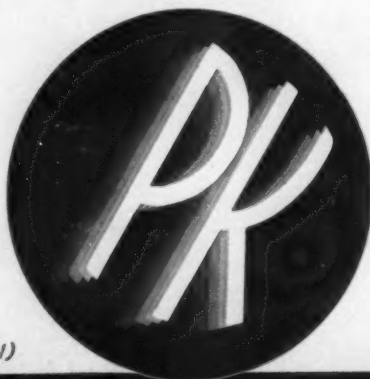


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Ideal Fertilizer Plant Setup Found in Abandoned Roundhouse



WHERE STEAM locomotives once stood huffing and puffing in their respective stalls in a railroad roundhouse, the sound of a new activity now replaces the hiss of steam. Super Crop Manufacturing Co., Ottumwa, Iowa, maker of mixed granular fertilizers, has successfully turned the old railroad building into a thriving enterprise for agriculture.

Owners and operators of the plant are David and Donald Carpenter. Harry E. Davis is general manager, and Edgar Nichols, plant manager.

After more than six years of operation, the operators can look back with satisfaction on a continually growing business, justifying their original faith in the agricultural potentials of southern Iowa and northern Missouri where the bulk of their customers live.

How the Carpenter brothers arrived at their decision to remake the old roundhouse into an efficient plant, is described by Dave Carpenter, president. "When we decided to start a fertilizer business, we looked

around for a suitable building which would provide ample storage space for fertilizer products," he said. "A number of possible locations were available, including a building at the Ottumwa airport, but there were objections from nearby residents who feared that there would be obnoxious odors coming from such a plant.

"We then heard of the old Milwaukee roundhouse which could be had, and we found it would suit our purposes very well."

The ten rusting locomotives parked in the building were towed away to the scrapheap, and the work of rejuvenation began. In the areas where the engines had been parked, bins were set up to hold raw materials and finished goods, and machinery moved in for the manufacture of fertilizer.

Super Crop manufactures nearly 20 grades of mixed goods, of which the granular 5-20-10 is most popular. Next in popularity is 10-10-10, and

following it, in descending order, are 10-20-10; 16-8-8; 5-20-20; 12-12-12, and 8-32-0.

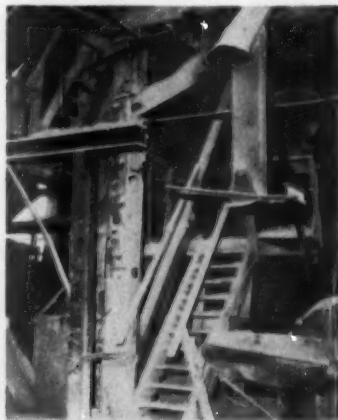
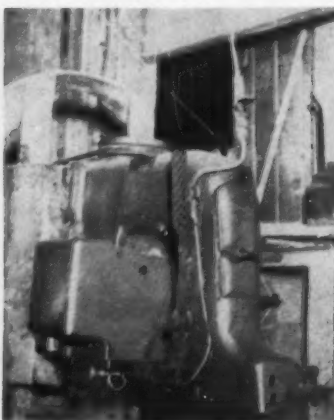
The plant operates at the rate of about 10 tons an hour, but on some occasions has put out as much as 200 tons a day. "The plant operates more efficiently at the 10-ton an hour rate," Mr. Davis reports. "It can turn out more tonnage all right, but better quality is achieved at the slightly slower pace."

Super Crop utilized the TVA continuous ammoniator for its production. The present plant was designed by Mr. Davis who was formerly in the fertilizer business in Chanute, Kansas.

Like many fertilizer manufacturing plants, the business is seasonal. "Since this is a one-season business," Mr. Davis commented, "we needed an off-season project to keep the crew busy the year around. This problem was solved with our opening a cement block plant. This keeps the men



AROUND ROUNDHOUSE—Above is general view in storage area of Super Crop Manufacturing Co., Ottumwa, Iowa. Large room is easily identified as being former parking area for locomotives. It now serves as an ideal storage space. At left is loading dock area added to the original structure. Below, left, is scene at bagging end of operation, and center, below, is closeup of sewing head with added gadget devised by Harry E. Davis, general manager. A small copper pipe is connected to compressed air line and blows thread into position to aid in operation. At right below is ground-floor view of ammoniator.



busy the whole year and enables us to keep a better grade of workman on hand."

Since the roundhouse was obviously not built for fertilizer manufacturing, Mr. Davis had to use a considerable amount of imagination and ingenuity in adapting an efficient plant to the semi-circular shape of the structure. Distances were considerable, so conveyors were installed to avoid long hauls. An elevator was built at one end of the building, loading docks were placed near the bagging machinery and the general efficiency of the plant stepped up.

Super Crop has a Kraft bagger and to it Mr. Davis has added a couple of new "wrinkles" of his own. Noting that extra motions were required in handling bags and pushing the string into place, he devised a copper tube connected to the compressed air line, which blows the string into place without the men having to reach for it.

Another innovation in this department was a means of making the filled bags turn a square corner on conveyor belts. This solved a problem of having to carry bags from the end of the conveyor to waiting trucks. Now, the bags are transported all the way to the vehicle via the belt.

Super Crop serves an agricultural area within a radius of about 75 miles. Distribution is made through dealers, most of whom pick up orders in their own trucks. Many of these dealers do custom application of fertilizers, Mr. Davis said.

MCA to Publish New Safety Pamphlets

WASHINGTON—The first in a series of pamphlets to be known as "Safety Guides" has been announced by the Manufacturing Chemists' Assn., Inc.

"Health Factors in Safe Handling of Chemicals" is the title of the new publication developed as a part of the activity of the Association's general safety committee. The four-page publication is designed to help the non-chemist in the chemical plant become familiar with toxicological terminology, to understand ways by which noxious substances enter the body and exert their harmful effects, and to know the basic principles of first aid treatment.

The new series of guides will cover aspects of safety in chemical manufacturing which are not dealt with in the widely used chemical safety data sheets, also published by the Association.

The second guide in the series, to be published in the near future, will deal with "good housekeeping" in chemical manufacturing. Others are planned to cover such matters as "electrical switch lockouts," "entering tanks," and other safety matters of broad application. Safety organization, precautions against environmental hazards, fire and safety training also are possible topics.

The Association's safety data sheets, safe handling manuals, and other activities of the general safety committee are credited in the industry with contributing much to the establishment of a high safety standard.

Copies of Safety Guide SG-1 are available at 15 cents each from the Manufacturing Chemists' Association, Inc., 1825 Connecticut Avenue, N.W., Washington 9, D.C.

ALABAMA SALES

MONTGOMERY, ALA.—Fertilizer sales in Alabama during January, 1960, amounted to 20,335 tons or 2,042 tons less than the same month in 1959, reported R. C. (Red) Bamberg, commissioner, Alabama State Department of Agriculture and Industries. Totals for the October, 1959, through January, 1960, period were 20,940 tons less than the same period the previous year.

Awarded Monsanto Sulfuric Contract

CHICAGO—Leonard Construction Co. of Chicago has announced receiving the contract award for furnishing materials, engineering and design for a Leonard-Monsanto contact sulfuric acid plant to be constructed in the Los Angeles area for the Collier Carbon and Chemical Corp.

The plant, which will have an initial rated production capacity of 250 tons of acid per day, will use spent alkylation acid, hydrogen sulfide and sulfur as raw materials.

The plant is designed specifically to meet the rigid air pollution regulations of the area, a Leonard spokesman said, and one of its unusual features is the Brink mist eliminator which will be installed to control fume emission from the stack.

The plant is scheduled for completion by late 1960.

Stock Distribution

NEW YORK—Subject to the approval of shareholders at the annual meeting on May 19, 1960, of an increase in the authorized common stock to 2,000,000 shares from the present 1,000,000 shares, the directors of Witco Chemical Co., Inc., have proposed a 50% distribution on common stock. If the increase in authorized common stock is approved by the shareholders, it is the intention of the board to consider a dividend payment of 20¢ per share during the third quarter of the year on the increased shares.

MONTHLY FERTILIZER SALES

STILLWATER, OKLA.—Sales of fertilizer in Oklahoma during February were considerably less than sales for the same month in 1959. Total for February of last year was 7,990 tons as compared with 5,440 tons sold this February.

Sales Gain Noted for St. Regis During 1959

NEW YORK—The annual report of St. Regis Paper Co. and consolidated subsidiaries for the year ended Dec. 31, 1959, now going forward to stockholders, shows large gains in sales and earnings, establishing new records. Higher rates of production were recorded in practically every division. Net sales for last year at \$474,393,134, compared with \$408,626,275 in 1958. Net income for 1959 at \$28,615,519, was equal, after preferred dividends, to \$3.01 per share of common stock, on 9,363,515 shares. This compared with \$21,998,072, equal, after preferred dividends, to \$2.41 on 8,941,118 shares in 1958. Of the \$65,766,859 increase in sales, approximately 79% resulted from a strong improvement in business throughout the company. The balance represented the net sales of companies acquired in 1959.

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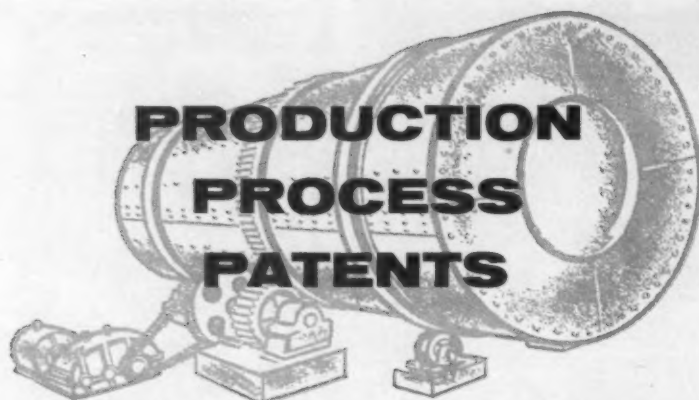
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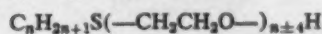


2,928,728

Phosphate Compositions. Patent issued March 15, 1960, to Lloyd E. Weeks, Union, Ohio, assignor to Monsanto Chemical Co., St. Louis,

Mo. A method of producing an ammonium phosphate solution with minimized sludge-forming characteristics from wet process phosphoric acid prepared from spent alkylation acid,

which method comprises adding a minor proportion of a polyoxyethylene thioether of the class



wherein n is a number between 10 and 20, inclusive, to said wet process acid, neutralizing the said acid with ammonia at a temperature in excess of 75° C., and then rapidly cooling said neutralized product to a temperature below 35° C.

2,929,846

Method of Making a Fungicidal Substance. Patent issued March 22, 1960, to Charles W. Gates and Harry D. Glenn, Naugatuck, Conn., assignors to U.S. Rubber Co., New York. A method of making a fungicidal substance comprising mixing disodium ethylene bis dithiocarbamate in a volatile organic liquid medium with phosgene, in molar proportions of from 1 to 1.2 moles of phosgene for each mole of disodium ethylene bis

dithiocarbamate, at a temperature of from -10° to +20° C., for a period of from 1 to 20 hours, and separating from the said liquid medium a resulting solid material, the said separated solid material thereafter evolving carbon oxysulfide spontaneously to yield a yellow fungicidal product.

2,929,850

Preparation of Insecticides. Patent issued March 22, 1960, to John P. Luvisi, Park Ridge, Ill., assignor, by mesne assignments, to Universal Oil Products Co., Des Plaines, Ill. A process which comprises reacting a polyhalocycloalkadiene with a polyhalo substituted acetaldehyde at a temperature in the range of from about 200° to about 260° C., and recovering the resultant polyhalo substituted cyclic reaction product.

Jack Wilson Chemical Doubles Plant Capacity

STOCKTON, CAL.—The Jack Wilson Chemical Co. has doubled plant capacity this year with a remodeling program that steps production of pelletized weed killers up to 100 lb. per four minutes as compared to 100 in eight minutes' time.

Jack Wilson, owner and manager, reported the installation of two wider drying belts with new fans which can dry the impregnated pellets much more rapidly.

In addition, Mr. Wilson announced the appointment of four new distributor organizations to handle the Chloro IPC weed killer and other chemicals processed at the Stockton plant. These four bring the total number of distributors in four western states—California, Washington, Oregon, and Idaho—to 32. The new representatives are Brown and Bryant Co., of Shafter; Los Angeles Chemical Co., Los Angeles; Agrichem Industries, Davis, and the Oasis Chemical Co., in El Centro, Imperial Valley.

The Wilson firm was founded in 1945.

Co-operative Volume

WASHINGTON—The gross business volume of farmer cooperatives amounted to \$14 billion in fiscal 1957-58, according to the latest annual survey made by Farmer Cooperative Service, U.S. Department of Agriculture. This was an increase of about 4% over the preceding year. The figure does not include business of associations in Alaska and Hawaii, since they were not states during the period covered.

Richardson Manager

CLIFTON, N.J.—The appointment of John Kenyon as St. Louis district manager has been announced by Richardson Scale Co.

Prior to this appointment, Mr. Kenyon was a sales engineer working out of Richardson's St. Louis office. He has been with the firm for 13 years.

WINS VERDICT

BUFFALO, N.Y.—The trial of the American Agricultural Chemical Co. here on a charge of violating city ordinances by causing dust and noxious fumes resulted in an innocent verdict in City Court.

Chief Judge Arthur J. Cosgrove's written ruling stated:

"The evidence indicates that the factory involved here has been in operation legally within the city over 80 years and that its processes have been improved to prevent the emission of dust and fumes and there is no evidence that any better measures could be taken to improve the present processes to this end."

The complaint was filed by city boiler inspector Karl E. Zakrisson, who charged that great quantities of grayish white dust were being deposited on premises and cars parked in the neighborhood.



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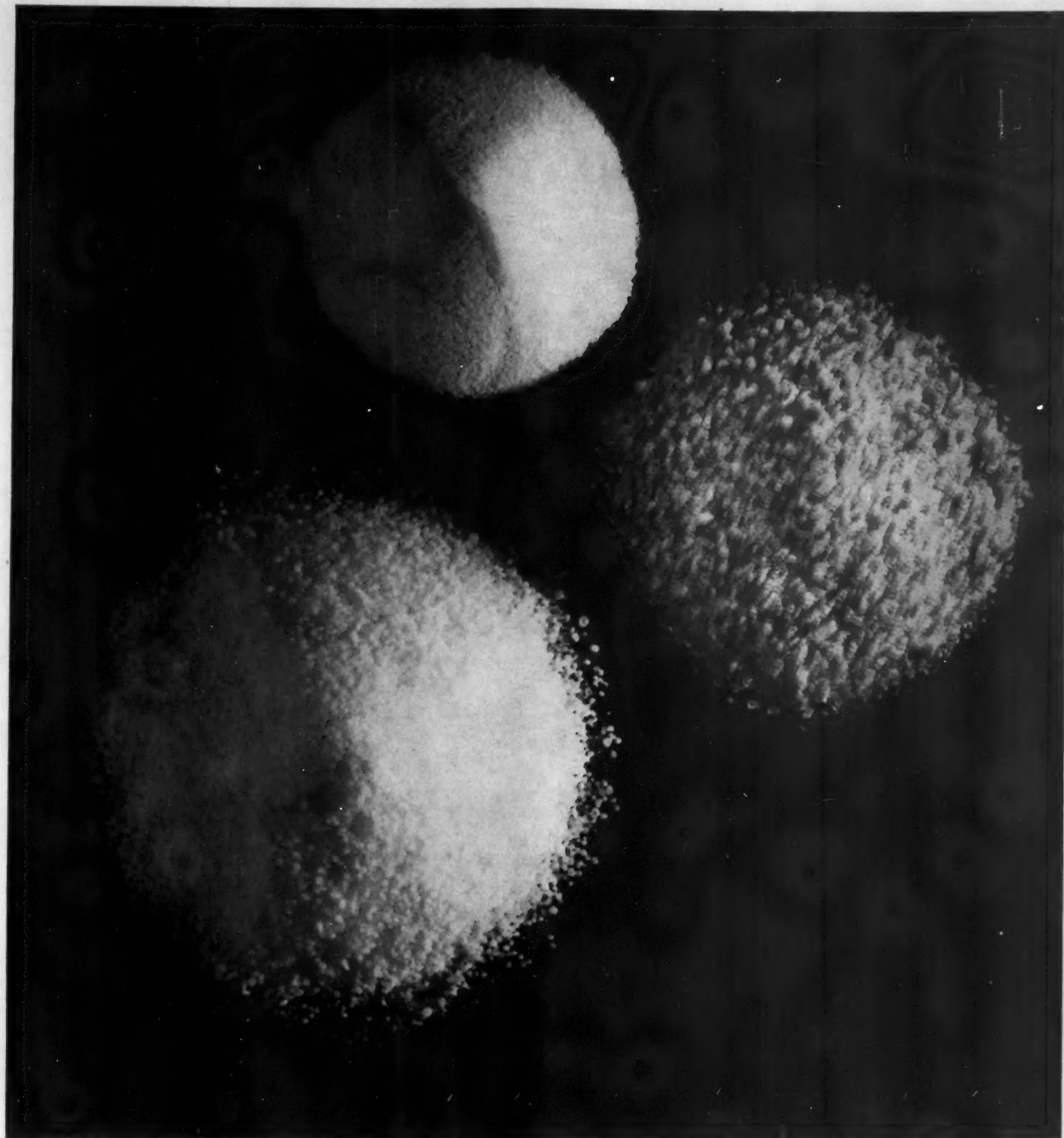
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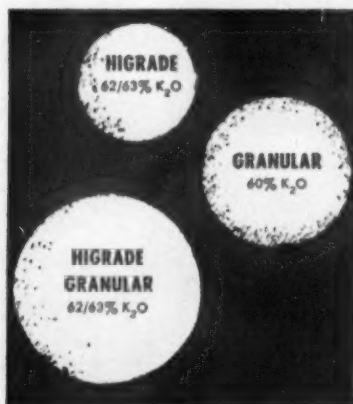


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New Calspray Unit At Kennewick Set For Full Operation

CALIFORNIA SPRAY-CHEMICAL CO. expected to put into operation its new \$5.5 million fertilizer plant at Kennewick, Wash., early in April. Part of the plant, the nitric acid unit, has been in operation all winter, having been put on stream last October. Construction was begun a little over a year ago.

C. C. (Cal) Dorrough, manager of the new plant, said that Calspray, maker of the "Ortho" line of agricultural products, had located the plant at Kennewick for a number of reasons. First, he said, is the availability of anhydrous ammonia manufactured at a Phillips Chemical Co. plant a mile away and piped to the new Calspray plant.

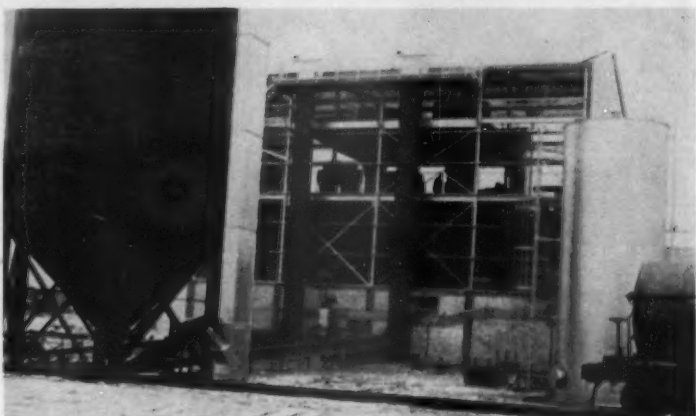
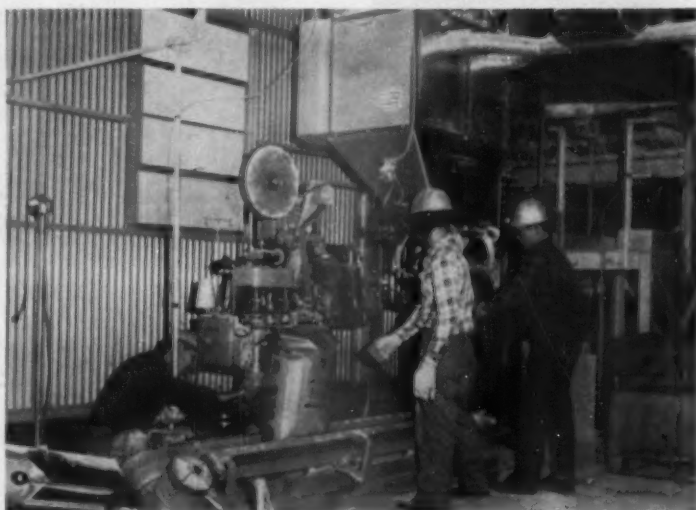
Second reason, Mr. Dorrough says, is the proximity to a big market in the Pacific Northwest; and third, the possibility of export markets being served direct by loading sea-going barges at the plant's own Columbia river dock. The firm has invested \$125,000 in the dock facility and the Port of Kennewick has made extensive channel improvements to serve Calspray and several other plants in the area.

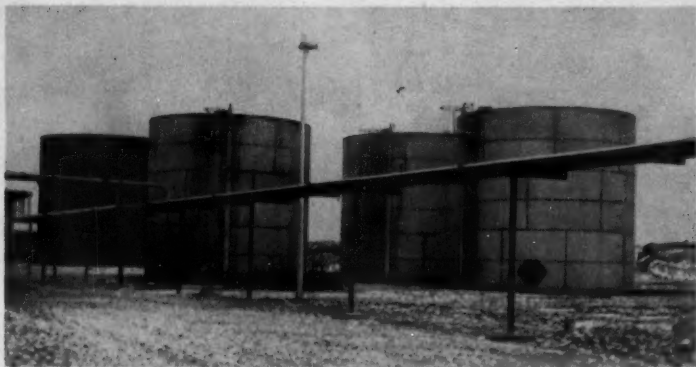
The new plant is a well-integrated layout which includes extensive storage facilities both for raw and finished materials, the NH₃ pipeline, the dock, spurs to two mainline railroads (Spokane, Portland and Pacific—owned by Northern Pacific and Great Northern jointly, and Union Pacific), and proximity to through highways

AT CALSPRAY PLANT—Top photo: Cal Dorrough, manager of plant. Second photo shows bagging unit at ammonium nitrate portion of facility, and under it is the complex unit which was still under construction when picture was taken early in March. Below is aerial view showing (1) bagged products warehouse; (2) prilling tower with drying, coating and bagging units at right; (3) nitric acid plant; (4) bulk complex bagging room; (5) storage warehouse (80x300); (6) mixing plant; (7) plant offices; (8) Columbia river dock; (9) access road, and (10) rail spur. NH₃ comes in via pipeline from Phillips Chemical plant about 1 mile to left.

serving the entire marketing area of Washington, Oregon, Idaho, Montana and Utah.

The plant is capable of producing 150 tons of ammonium nitrate per day but it is doubtful that the plant will run at that capacity more than half the year, as seasonal demands might require, according to Mr. Dorrough. Ammonium nitrate solution capacity is 300 tons a day, but again





NITRIC ACID STORAGE—Plenty of storage space for nitric acid is provided at new Calspray plant at Kennewick, Wash. Tanks above were to be ready for plant's opening shortly after April 1.

the full capacity would be utilized only on rare occasions.

Capacities of the complex unit will vary (according to what is being run) from 200 to 300 tons a day. The complex unit will produce 20-20-0; 20-10-0 or 14-14-14 formulations of pelleted fertilizers. Nitric acid can be produced at the rate of 150 tons a day.

This means, according to Dr. Dorrough, that with the nitric acid unit on a 7-day week, the ammonium nitrate and complex units can be operated on a 5-day week.

Calspray has one of the few short prilling towers in the industry. The short tower operates on the principle of solidifying the ammonium nitrate by cooling where the high tower uses the evaporation principle. Mr. Dorrough says the short tower represents half as much capital investment as a high tower of equal capacity.

The only company in the U.S. using the French P.E.C. process (at its Richmond, Cal., plant since 1956), Calspray is installing another P.E.C. process complex unit at Kennewick. Nitric acid is used to acidulate phosphate rock in the P.E.C. process and Calspray says the nitrogen from the acid has an advantage in plant food. Pelleted plant foods manufactured by this process are marketed under the "Unipel" trademark of Calspray.

Phosphate rock is shipped to the plant by rail from the Idaho-Wyoming deposits; potash comes the same way from Trona, Cal. The plant has storage capacity for a 5-day supply of potash, 10-day supply of phosphate rock and has three 70-ton storage tanks for NH₃.

The plant has two finished product warehouses. A bulk warehouse for the complex products is 80 x 300 ft. with an 80 x 100 ft. addition for the two bagging lines. The ammonium nitrate pellets and bagged complexes are housed in another warehouse almost as large. The pellet plant has its own bagging facilities.

The plant will employ about 80 people during the March-April-May peak each year with about 50 as the normal year-around work force, Mr. Dorrough said. The manager is a graduate in electrical engineering from the University of California and spent almost 20 years in the beet sugar field until switching to fertilizers in 1953 with Best at Oakland. He moved over to Richmond when Calspray built there in 1955 and was superintendent of the plant until moving to Kennewick last year.

Calspray is the fifth chemical plant to be built on the Port of Kennewick's industrial site five miles south of the south central Washington city. Chemicals in the area have been booming since Shell installed its storage facilities across the Columbia on the Snake River (Port of Pasco) in 1955. Phillips Chemical Co. built its plant in 1956, upon arrival of a natural gas pipeline from the south. Phillips now has a daily production of 200 tons of anhydrous and aqua ammonia. Allied Chemical Corp. produces ammonium polysulfide, liquid ammonium sulfate, aluminum nitrate and nitric acid.

Other plants in the area are those

of the Kerley Chemical Co., which produces "Nitro-Soil," a sulfur-ammonia fertilizer using ammonia from the Phillips plant.

Strobane Insecticides Marketed by Stauffer

NEW YORK—Stauffer Chemical Co. is now marketing several cotton insecticides based on Strobane*. Identified chemically as a chlorinated hydrocarbon, Strobane has been field tested for several years in the Cotton Belt. It has proved to be effective, with good residual control, against a variety of insects including bollworm, boll weevil, cotton leaf worm, garden web worm, lygus bugs and other mirids, cotton fleahoppers, thrips, cotton leaf perforator, stink bugs, tarnished and rapid plant bugs, fall armyworm, cutworms and grasshoppers. Blended with DDT, Strobane has yielded good control of resistant boll weevil.

Currently, Stauffer is producing several Strobane formulations: Strobane 6-lb./gal. emulsifiable concentrate; Strobane 20 Dust; Strobane-DDT 4-2 lb./gal. emulsifiable con-

centrate and Strobane-Sulfur 20-40 Dust.

Used in a range of aerosol insecticides for household and industrial applications during the past five years, Strobane has demonstrated low toxicity to humans and animals.

Technical Strobane, from which Stauffer formulates these insecticides, is produced by Heyden Newport Chemical Corp. and is covered by U.S. patent 2,767,115.

*Strobane is a registered trademark of Heyden Newport Chemical Corp.

OFFICERS NAMED

PHILADELPHIA—Woodward & Dickerson has announced the appointments of H. A. C. Rauchfuss as chairman of the board and C. Earl Gettinger, president. The company has been in Philadelphia for 87 years. It is an exporter and importer of fertilizer chemicals, minerals and animal feed ingredients.

PAYLOADER®

PREFERRED BY FLEET OWNERS

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FLEETS

Among CHEMICAL and FERTILIZER companies
in the United States and Canada operating
3 or more "PAYLOADER" units totaling . . .

3102

MACHINES

In addition to the fleet owners, thousands of individual owners have made "PAYLOADER" tractor-shovels the overwhelming favorite throughout all phases of the chemical and fertilizer industries. Fleets ranging as high as 230 machines are proof of owner satisfaction with "PAYLOADER" performance, service and dependability.

Typical of the many fleet owners, is the fertilizer plant of C. ROY CURTIS & SON of Marion, New York, with a fleet of 5 "PAYLOADER" machines dating back to 1950. All 5 machines are still in use. Says Roger Hubright, Plant Supt., "We have been using "PAYLOADER" machines

continuously for the past ten years, with very satisfactory all around production and mechanical service. We like the large load carrying capacity of our H-25 with its compact design which enables us to increase hauling output without modifying other plant facilities. H-25 has plenty of power and it's easy to operate."

You too will find a "PAYLOADER" a steady, dependable performer, with many exclusive features which contribute to greater output at lower over-all cost. Choose the exact machine to fit your needs from 20 models. Send for complete details.

HOUGH®



THE FRANK G. HOUGH CO.

LIBERTYVILLE, ILLINOIS

SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY



HOUGH, PAYLOADER, PAYMOVER, PAYLOGGER and PAY are registered trademark names of The Frank G. Hough Co., Libertyville, Ill.

THE FRANK G. HOUGH CO.

279 Sunnyside Avenue, Libertyville, Ill.

Send data on new H-25 "PAYLOADER".

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*"I'm sold on your
Sul-Po-Mag Program . . ."*



George Lippincott, president,
Dorchester Fertilizer Co.,
Cambridge, Md.

"... should really help sales!"



Alf Oines, president,
Michiana Chemical Co.
of Niles, Mich.

Many manufacturers count on this Sul-Po-Mag[®] program to boost fertilizer sales and profits

*"SPM program has paid off
for us where it really counts . . .
in increased fertilizer sales"*



T. F. Bridgers, president of
the Farmers' Cotton Oil Company,
Wilson, N. C.

"... has helped us move fertilizer"



John C. Crissey, division manager
Soil Building Service, GLF EXCHANGE,
Ithaca, N. Y.

"Yields of tobacco UP . . . as much as 60 to 101 pounds an acre! Those are results of actual experiment station tests made with complete tobacco fertilizer containing Sul-Po-Mag" — with these words a radio announcer in the Southeast begins a 1-minute Sul-Po-Mag spot announcement. Thousands of growers in the area will hear his profit-making message. Through it they will seek out their local fertilizer manufacturers who subscribe

to the SPM program. Radio . . . just one of the SPM *super-salesmen*.

IMC's extensive Sul-Po-Mag program is educational in scope. While selling the need for long-lasting magnesium from SPM in crops and soils, it is also selling YOUR fertilizer. This is a big program and another reason why IMC puts these top "salesmen" on your team . . . without cost to you, of course.

A full schedule of IMC agricultural

magazine ads — national and regional — as well as state newspapers work hard for you . . . seven days a week. Various promotional materials are available for you to use in pinpointing magnesium fertilization problems of the major crops in your area. And they carry your company imprint.

See the adjoining page for details on International Minerals' SPM program. Then contact your IMC representative for the complete story.



The Sul-Po-Mag story is a lively topic of conversation wherever growers meet. One of the reasons is IMC's national and regional SPM advertising program. In 1959, Sul-Po-Mag advertising reached 2,567,000 farmers, growers and influence groups in magazines alone.



Consumer crop packages are for you to use on the local level. This potato crop package is one of eight complete crop packages that provide you with jumbo postcards, folders, newspapers, and magazine ad mats, news releases and radio announcements promoting Sul-Po-Mag use on individual crops.



Colorful and forceful SPM posters are available for you and your dealers. When imprinted with your company name and address, they tell growers you have Sul-Po-Mag ready to serve their crop needs. These display signs are full color and imprinted free of charge.



The Sulphate Bulletin features the latest news and research reports on SPM, along with useful information on sulphate of potash. Every 3 months more than 30,000 bulletins are sent to fertilizer manufacturers, county agents, vo-ag teachers, soil conservationists and growers.



Sul-Po-Mag mailers and envelope stuffers are effective for repeat sales. You can send them out with monthly billings and keep telling the SPM story. Many manufacturers have earned extra sales with this quick-fact form of direct selling.



This seal is available as production proofs for printing on the bag. It will enhance your bag design as well as tie you in with the total SPM program. Also the seal comes as bag tags or stickers. Three forms of the seal are provided to meet your state requirements.



IMC's Sul-Po-Mag radio programs cover magnesium needs through 1-minute spot commercials. Content is terse, with factual and helpful tips to growers. This highly important sales medium stimulates impulse buying during the fertilizer season.



The Magnesium booklet is a vital part of the Sul-Po-Mag program. It illustrates the importance of magnesium for high crop quality and top yields. IMC has answered thousands of questions on recognizing magnesium deficiencies in fruit, vegetables, field crops.



The imprinting service is the backbone of the SPM program. Your company name and address on a direct mailer or full-color wall chart has all the authority of a direct contact with a customer. Your name and location are important parts of your total advertising effort.

Products*
for growth



*Trademark

AGRICULTURAL CHEMICALS DIVISION

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

Administrative Center: Skokie, Illinois

Pennsylvania Firm Invests in New Equipment, Cuts Costs

A PENNSYLVANIA plant food company has proved to its own satisfaction that investments in labor-saving equipment and materials-handling machinery pays off even in a small operation. The Organic Plant Food Co., Lancaster, Pa., owned by

Norman Brubaker, faced by severe price competition on all sides, decided that the way to compete successfully is to cut production costs.

In discussing the situation, Mr. Brubaker says that price is frequently about the only advantage some

larger concerns have over their smaller competitors, and in many instances farmers are reluctant to change sources of fertilizer on that basis alone. "There are too many other factors involved which a farmer feels is important to his welfare so that a price concession will not always sway him. Inasmuch as price is our main competition more than any other factor, we have surveyed our entire operation to see what we could do to hold ours down. As a result, we have enjoyed greater efficiencies and it has made us competitive to others, thereby helping us to hold our regular customers and gain new ones.

"In an effort to get greater sales volume, many firms have promoted price cuts as their feature rather than other aggressive merchandising and management methods to move fertilizer." Because of this, he maintains, the small formulator must move progressively with the times in order to enjoy the greatest production and efficiency so that his customers can also enjoy the best price situation.

In recent years, the Organic Plant Food Co. has spent a considerable amount of money on mechanical equipment. While Mr. Brubaker was told that it was folly to invest so much money in this equipment, he nevertheless did so and found that it paid for itself sooner than he had anticipated.

"We invested in a fork lift, a power scoop and shovel, spreader trucks and additional equipment to cut down labor and increase efficiency and productivity," he points out. "The savings became quite evident from the first time we began to use this equipment. Naturally, we moved the savings in the direction of our customers and we immediately eliminated one of the foremost barriers to our sales volume—which was price."

"In all our years of experience in this business, we have found that farmers still like to do business with small formulators. They feel that they can talk closer to the 'men at the top' and get better results this way. In addition, a closer and more friendly relationship and attitude is built up that works to their advantage as well as to our own. Take credit for example.

"While 80% of our customers can pay cash, there are a number who must have credit. Because we are so familiar with our customers, we know how much we can extend and how long we will have to wait before we get paid. Thus, our credit situation is greatly simplified."

The firm was started in 1937 with Mr. Brubaker and two other partners. Shortly afterwards, the two partners sold out to Mr. Brubaker who took over complete control of the fertilizer plant.

Mr. Brubaker and his son, William L., whom he recently designated as president of the firm, make continued year-round contact with their customers and prospects. They are constantly discussing their customers' problems, crop raising in the county and other conditions that make them more closely associated with their customers' needs and requirements.

"We specialize in 'tailor made' or



COST CONSCIOUS—Norman Brubaker (above) and son, William L., head the Lancaster, Pa., firm described here. William recently was named president by his father. Other photos show additional equipment to reduce production costs and to provide customer service. Motorized shovel does labor of two additional men. At right, nitrogen broadcast device is attached to Jeep.

farmer formula fertilizers to meet the soil conditions to best advantage," explains Mr. Brubaker. "We are constantly urging soil analysis and handle this through the Pennsylvania State College and the county agent's office.

"Even if a farmer knows the exact fertilizer analysis he wants, we still urge him to have a soil test taken to justify his own recommendation. Even farms that raise the same crops and are located just a few miles apart may require different fertilizer analysis because of dairy herds or other conditions that affect soil situations. Because of this personal interest, customers have come to rely upon us to mix the type of fertilizer which is most suited to their requirements."

The major crops in Lancaster and the adjacent counties are: Tobacco, tomatoes, corn for steer and dairy feed. The average farm is about 60 acres and, in recent years, a switch to higher analysis fertilizers has been noted. A 4-8-12 or a 4-8-16 having higher potash content is being used on tobacco crops. An 0-20-20 formulation is used on tomatoes if it follows a heavy fertilized crop the previous year. For corn, a 5-10-10 formulation has been found to be the most suitable.

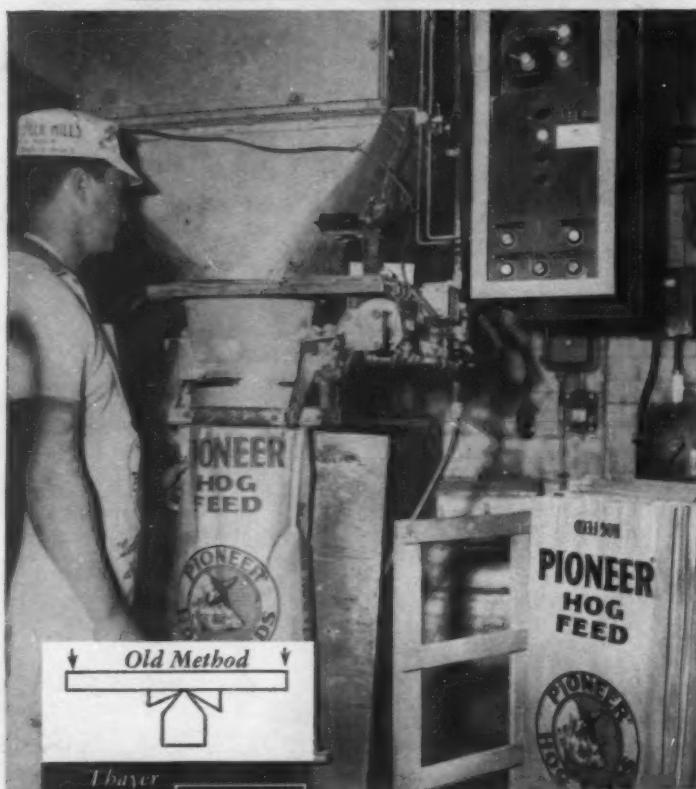
Spreader service is available to farmers requesting it, and the demand has been increasing steadily. Approximately 20% of the fertilizer sold to farmers is spread by the firm's truck which charges a flat rate of \$1.50 per ton. Approximately 4 tons an hour can be spread with Mr. Brubaker pointing out that this service is a "break even" operation which is handled at no profit and only as an accommodation to his customers.

Just recently, the company equipped a Jeep truck so that it could broadcast nitrogen quickly, efficiently and economically. This service was added by this formulator when he found that many local farmers were not equipped to make light applications of nitrogen with the heavy duty equipment that they used with regular fertilizer.

"We equipped a Jeep truck with a funnel that was attached to the rear capable of holding 200 pounds of nitrogen," explains Mr. Brubaker. "This light vehicle can get into areas which up to now had been inaccessible to custom spreading equipment. Spreading 100 to 150 lb. an acre with this vehicle is fast and economical for the farmer. The first season that we placed this vehicle in use, we sold more than 30 tons of nitrogen which is considered plus business for us."

"When we recently broadcast ni-

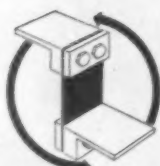
RED COMB PIONEER MILLS GAINS ACCURACY, REDUCES COSTLY OVERWEIGHTS with **THAYER SCALES**



All Thayer Scale and weighing equipment have the patented FLEXURE PLATE system as the weighing mechanism. It has no pivots to wear out. Dust, dirt, vibration or shock does not affect its high accuracy which is guaranteed for the life of the scale.

Red Comb Pioneer Mills selected the Thayer Automatic filler and packer — Model N18C — because it is capable of handling a large range of feeds accurately and reliably. The scale and hopper are totally enclosed as one unit tied in with a bulk and dribble belt feeder. The equipment will handle all feed mill materials from free flowing to sticky dairy feeds with no problems — capacities up to 15 bags per minute with a single scale, proportionately higher with duplex or multiple units.

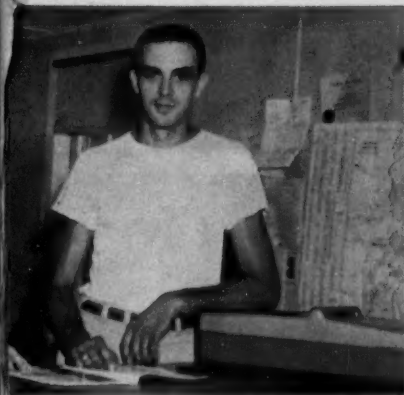
This Thayer automatic unit is electrically controlled on a fill-dump-bag release cycle. By simply setting one dial, the scales are automatically adjusted for a change-over from one type of material to another. Savings of feed materials, of set-up and maintenance time increases profits!



THAYER SCALE

AUTOWEIGHTION SYSTEMS FOR FILLING
BATCHING AND CHECKWEIGHING

THAYER SCALE CORP. THAYER PARK PEMBROKE, MASS.
A Subsidiary of SUNDESTRAND CORPORATION



trogen over a country club's golf course, numerous members of this club requested us to do the same for their own grounds and fields," points out Mr. Brubaker, "so that we enjoyed plus business through this activity. Right now, we feel that we are barely scratching the surface of a nitrogen service which we feel we can build up into gigantic proportions, and we intend to promote this activity more aggressively in the very near future."

All fertilizer mixing is done in the company's main plant 100 wide by 135 ft. in depth. In addition to Mr. Brubaker and his son who handle the sales activity of the business, four employees do the mixing, formulation and other jobs. Insecticides are also formulated in bags with approximately 20 tons being distributed to customers annually. Formulations on insecticides are also "tailor made".

"We do everything in a small way that the large formulator does in a big way and, in this way, maintain a stable and economic condition which reflects in our business growth and customer satisfaction," points out Mr. Brubaker. "Coupled with the personal attention and service that we give to our customers, we find that the small formulator is just as important to the farmer today as he ever was in the past."

Colloidal Products Names Southern Manager

SAUSALITO, CAL. — Colloidal Products Corp. of Sausalito announces the appointment of Leonard



Leonard Lett

Lett as southern manager. A native of Alabama, Mr. Lett has been associated with the National Cotton Council, Memphis, Tenn., for the past 13 years as agronomist in the production and marketing division.

During this period, Mr. Lett worked actively with state and federal research and education agencies, the agricultural chemical industry, and the cotton industry. His work was primarily in cotton defoliation, fertilization, chemical weed control, diseases, agricultural weather forecasting and other activities aimed at increasing efficiency of cotton production.

After receiving a B.S. degree in agricultural science in 1940 from Auburn University, Mr. Lett entered the armed services. Upon discharge in 1945 he returned to Auburn where he received a master's degree in agronomy.

CHANGE IN COMPANY NAME

CHICAGO—Chicago Apparatus Co., which recently acquired Hell Scientific, Inc., a 93-year-old St. Louis laboratory supply house, has changed the corporate name to "Chicago Apparatus Co. (St. Louis)" as of April 1. On this same date the firm moved to a new location, 5147 Brown Street, St. Louis 15, Mo.

Two New Appointments

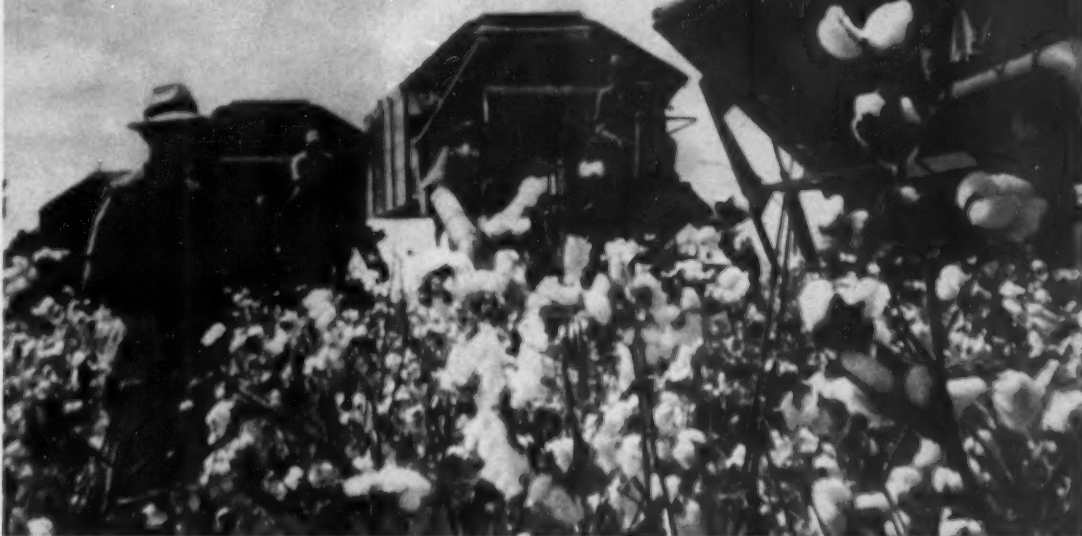
PHILADELPHIA—Harry B. Nason has been named staff assistant to the president of SunOlin Chemical Co. and Nicholas A. Collora has been

named mechanical engineering assistant to Richard D. Burt, who is in charge of SunOlin's current engineering planning. Both appointments were effective April 1, according to James I. Harper, SunOlin president.

Mr. Nason formerly was a personnel assistant in industrial relations at Sun Oil Co.

Mr. Collora was a project mechanical engineer at Olin Mathieson Chemical Co.

A special message for insecticide formulators . . .



VELSICOL THE GROWING IMPORTANCE OF ENDRIN IN PLANT PEST CONTROL

ENDRIN ANSWERS MANY NEEDS—Velsicol Endrin fills the need for an insecticide of relatively low toxicity to humans that will kill a wide variety of plant pests that are either resistant to other insecticides, or difficult to control. It is a chlorinated hydrocarbon, with lasting residual qualities. Although it has greater insecticidal activity than other chlorinated hydrocarbons, it can be used safely by individual farmers. It is also economical.

USE INCREASING—Endrin now has over forty label acceptances (see list below) covering control of many more than that number of insects. Some of these acceptances represent substantial tonnage of potential use. Among these volume uses are the control of insects infesting cotton, tobacco, apples, sugar beets, sugar cane, and cabbage and other cole crops.

COTTON INSECT CONTROL—Endrin is the one insecticide that will control both boll weevils and bollworms. Cotton farmers find that it improves quality and yield at substantial savings. Long residual action means fewer applications per season.

TOBACCO INSECT CONTROL—Endrin is effective against many tobacco insects that formerly could only be controlled by a combination of insecticides. Endrin kills horn worms, tobacco

budworms, grasshoppers, tobacco flea beetles, cutworms, loopers, and many other pests of tobacco.

RED BANDED LEAF ROLLER CONTROL ON APPLES—Endrin now has label acceptance for control of red banded leaf rollers on apples. In grower trials, it has been proven effective against even resistant leaf rollers. The same dosage will also kill plum curculions, which results in a considerable economy for the apple grower.

VELSICOL PROMOTIONS—During 1960, Velsicol Endrin will be promoted in various areas for major uses. These promotions will include advertising to farmers and dealer sales support. Details will be released as available.

ADVANTAGES OF VELSICOL ENDRIN—Velsicol Endrin is easy to formulate. The white Endrin crystals dissolve quickly, and make bright, clear emulsifiable concentrates. The fine particles mix uniformly and grind easily, to help make top quality dry formulations. Velsicol Endrin is packaged conveniently, in 100 pound fiber board containers with telescopic slip-on covers. These containers are of narrow diameter, for easy lifting and pouring, and have a polyethylene lining, which permits drums to be completely emptied without loss of material.

NOW AVAILABLE! A COMPLETE NEW SERIES OF ENDRIN LITERATURE! MAIL THE COUPON TODAY FOR YOUR COPIES OF THESE INFORMATIVE FOLDERS!

VELSICOL ENDRIN

KILLS MAJOR INSECT PESTS OF THESE CROPS
ALFALFA • APPLES • ASPARAGUS • BROCCOLI • CABBAGE • CAULIFLOWER • CLOVER • CORN • FIELD CORN • SWEET CORN • COTTON • CUCUMBERS AND SUMMER SQUASH • EGG PLANT AND PEPPERS • GRAPES • ORNAMENTALS • POTATOES • SMALL GRAINS • SORGHUM • STRAWBERRIES • SUGAR BEETS • SUGAR CANE • TOBACCO • TOMATOES • OTHER VEGETABLES



VELSICOL CHEMICAL CORPORATION
330 East Grand Avenue, Chicago 11, Ill.
International Representative: Velsicol International Corporation, C.A.—
P.O. Box 1647, Nassau, Bahamas, B.W.I.

C-48

Please send me your new series of Endrin literature.

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Address

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The product name 'DI-MON' is rendered in large, bold, three-dimensional block letters. Each letter is composed of multiple parallel lines, giving it a sense of depth and a metallic or industrial appearance. The letters are arranged in a slightly staggered, perspective view.

DI-MON

18-46-0 GRANULATED

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A product of uniform particle size and guaranteed chemical analysis. **DI-MON** is a free flowing product that will not cake or set up under normal storage conditions. **DI-MON** makes possible a broader range of formulations, reduces material costs, increases production rates and produces a better conditioned fertilizer.

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TENNESSEE



CORPORATION

Adding Pesticides, Trace Elements to Liquid Fertilizer, Production Problem

By Archie V. Slack*

Tennessee Valley Authority
Wilson Dam, Alabama

IN THE PAST decade or so there has been a growing need for inclusion in fertilizers of materials other than the usual nitrogen, phosphate and potash. There are several reasons for this. Fertilizers have been increased in grade to decrease handling and shipping costs, with the result that there is less room for the secondary and trace elements that formerly were included incidentally because they were present in the original raw materials. There have also developed needs in some areas, and for some crops, for specific minor elements in fairly large amounts, larger than would be supplied even by unpurified raw materials. Finally, improved farming practices have developed the need for adding such unrelated materials as pesticides to fertilizers.

The need for including additives in fertilizer has introduced several problems in production. In making solid mixes it is difficult to get good mixing of the small amount of additive with the other materials, and once mixed segregation may take place in handling. Moreover, some additives may not be compatible chemically with the main constituents of the mixture.

In liquid fertilizer production, the problem of incorporating the additive thoroughly is simplified but other problems may be increased, depending on the particular additive involved. If the additive is soluble, incorporating it in the liquid is easily accomplished and the product usually is quite satisfactory. Unfortunately, many of the additive materials needed are not soluble and therefore considerable difficulty may be encountered in incorporating them satisfactorily.

Secondary Elements

Of the secondary elements, calcium and sulfur are the ones most often added to liquid fertilizers. Addition of calcium is restricted mainly to the Pacific States, where it is used in the form of calcium nitrate in ammonium nitrate solution. Calcium is not compatible with liquid mixed fertilizer because it precipitates as the phosphate. There appears to be little need for adding it to mixed liquids, however, since in most cases use of lime from local sources should be more economical than including calcium in fertilizers.

*Paper presented at Southern Regional Liquid Fertilizer Conference, Easton, Ga., Feb. 9-11, 1960.

Sulfur is added both to nitrogen solutions and to liquid mixed fertilizer. Again, the practice is restricted almost entirely to the Pacific states. The sulfur is used in that area in two forms, as ammonium polysulfide and as ammonium bisulfite.

Little magnesium appears to have been used in liquid fertilizers. Like calcium it precipitates as the phosphate from neutral mixes containing phosphate. The best method for incorporating magnesium and other insoluble materials in liquid products probably is the suspension technique. In this method a fine particle size of the insoluble material is used and a suspending agent or other means is employed to give a stable, nonsettling suspension.

Commercial tests of this method have been reported. The suspension technique offers promise as a means of solving several problems of liquid fertilizers—not only incorporation of insoluble nutrients but also reducing costs by using wet-process phosphoric acid and increasing grade by suspending nutrient salts in their saturated solutions. Research on the method is being carried out at TVA and by fertilizer producers with promising results.

Trace Elements

Of the elements usually classified as trace elements, boron is the only one that has salts soluble in liquid mixed fertilizer containing phosphate. The other usual trace elements—iron, copper, manganese and zinc—are relatively insoluble. In tests at TVA, only 0.01 to 0.04% of these elements (added as the sulfates) could be dissolved in a 9-9-9 liquid fertilizer at room temperature.

Two methods are available for incorporating these elements. One is the suspension technique mentioned previously and the other is use of an agent to complex the element and make it resistant to precipitation by the phosphate.

Sequestration

The complexing of an element to render it soluble in aqueous systems is called sequestration. Both organic and inorganic sequestering agents are available. The organic types, also known as chelating agents, have received considerable notice in recent years because of their ability to form

trace element complexes stable enough to resist the tendency of certain soils to fix the element in an unavailable form. These complexes are soluble also in liquid mixed fertilizers.

For general use, an inorganic sequestering agent such as a polyphosphate appears to be a better choice because of the relatively low cost. While the mechanism of metal complex formation with polyphosphates is not well understood, it is probable that a chelating action is involved.

In work at TVA the sequestering action of superphosphoric acid has been studied. This acid (76% P_2O_5) contains part of its phosphate in the polyphosphate form, 42% as pyrophosphoric acid and 9% as higher poly acids; the remainder is orthophosphate. The polyphosphoric portion has been found to be an effective sequesterant for metallic trace elements, with the exception of manganese. Manganese salts were soluble in solution made from the reaction product of ammonia and phosphorus pentoxide. Unfortunately, the NH_4^+ P_2O_4 reaction product is not as economical to produce as superphosphoric acid and therefore may not become available as a commercial material.

Use of sequestering effect of superphosphoric acid to incorporate iron, copper or zinc in liquid fertilizers appears attractive. Aside from the sequestering effect, use of the superphosphoric acid is advantageous because it increases the grade of the product as compared with use of ordinary phosphoric acid. Thus the sequestering effect is an incidental advantage, without extra cost for a sequestering agent.

Suspension

The suspension technique is especially applicable to the trace elements since they can be dissolved in the phosphoric acid before it is reacted with ammonia and will then precipitate in the finely divided, easily suspendable form during the neutralization. Exploratory tests of this method at TVA have shown promise. Trace element salts can also be suspended directly as described earlier under the discussion of secondary elements.

Pesticides

There has been a growing demand by farmers in recent years for mixtures of pesticides with fertilizers, especially for those pesticides useful in controlling soil insects. Addition of the pesticides to solid fertilizers has been found to be a very troublesome problem. Manufacturers complain of mixing difficulty, safety hazards, product liability and complications in state regulations.

Liquid fertilizer producers have had somewhat less trouble with the

Turn to ADDITIONS page 24



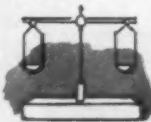
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FOR FERTILIZERS, AGRICULTURAL CHEMICALS & POWDERS

THE **Marion** MIXER offers better and lower cost mixing for the chemical industry. An exclusive Mixing and Blending Action makes possible the mixing of any top quality mixed product at less cost.



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ACCURATE

If the formula is right—the **MARION** MIXER will mix it with complete accuracy.

THE **MARION** MIXER, now in use in many chemical plants throughout the country, is designed to produce the highest tonnage at the lowest possible cost. Also, its simple but efficient design makes it an ideal special formula mixer.

The **MARION** MIXER is the leader for mixing: Dry and semi-wet chemical powders—Agricultural chemicals—Fertilizers—Materials for chemical processing plants—Insecticides.

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CITY STATE



SAFETY AWARD—For the fourth consecutive year, the Presidential Safety Trophy has been awarded to employees of the Plant City operation of Smith-Douglass Co., Inc., for their safety record during 1959. R. M. Wilber (left), manager of the Florida operation, accepted the gold trophy on behalf of the employees, which was presented by G. T. Newman, Smith-Douglass director of safety and labor relations. The Presidential Trophy is presented each year to one of the 18 Smith-Douglass plants which achieves the best safety record for the calendar year.



Arcadian® News

Volume 5

For Manufacturers of Mixed Fertilizers

Number 4

Sell More Tonnage NOW Sell ARCADIAN® Nitrogen

The rush season for mixed fertilizer sales will soon be over. But, there is still time to extend your season and sell more tonnage. Now is the time to aggressively sell ARCADIAN nitrogen materials (liquid and dry) for top-dressing and side-dressing.

Demand is Increasing

The market is there! Thousands of farmers in your sales territory will buy nitrogen for supplemental application this spring and summer. It will pay you to make sure that your mixed fertilizer customers buy their straight nitrogen from you. You can't help but benefit when your customers make you their headquarters for all their fertilizer needs.

You strengthen customer loyalty and you get a bigger share of the fertilizer market, when you supply all of the mixed goods analyses and straight materials your customers need and want. It pays to establish your prestige and your leadership as a dependable, one-stop, full-line source of supply.

You Benefit 5 Ways

Here are some of the benefits you get when you sell ARCADIAN nitrogen: 1) You increase your total sales and profits. 2) You help farmers to get better yields and insure that response to your mixed fertilizers will not be limited by lack of nitrogen. 3) You spread your overhead expense over a larger tonnage.

4) You keep your sales staff busy over a longer period.
5) You build farmers into exclusive customers for you and your dealers.

Nitrogen Division, Allied Chemical, manufactures and sells nitrogen for use in making mixed fertilizers and for direct application. Nitrogen Division has always fostered the role of nitrogen in a balanced fertilizer program and has spent millions of dollars to promote the use of mixed fertilizers. Nitrogen Division has also established ARCADIAN Nitrogen Products as the leading source of supplementary nitrogen for direct application.

Let Nitrogen Division Help You!

It will pay you to let Nitrogen Division work with you in helping you to offer your customers a complete line of mixed fertilizers and straight nitrogen materials. Many different ARCADIAN Nitrogen Solutions are available for the manufacture of every mixed fertilizer analysis now in demand. Many different ARCADIAN Nitrogen Products are also available to sell to farmers for direct application.

These products are powerfully promoted with the biggest nitrogen advertising campaign in history. For information about this campaign, see the following two pages. It will pay you to cash in on this campaign now! Extend your season and handle more tonnage, by selling ARCADIAN Nitrogen Products!



MORE RADIO

The ARCADIAN radio advertising campaign has been increased this year. More radio stations have been added and more time is being used on all stations.

MORE TV

Television stations in many farming areas are selling ARCADIAN with regular broadcasts which reach the farmer by eye and by ear several times each week. TV advertising gives extra impetus to sales.

BILLBOARDS

Large billboards, placed along well-traveled roads and highways in intensive fertilizer-consuming areas, display colorful posters during the fertilizer season, constantly reminding farmers of the profitable advantages of ARCADIAN Nitrogen Products.

BIG, NEW PROFITS FAST-MOVING

Here's powerful advertising support for you—a big, expanded campaign to sell complete fertilizers and ARCADIAN® Nitrogen Products! Nitrogen Division, Allied Chemical is going all out this year to carry the ARCADIAN message to millions of farmers. All types of media that reach and influence farmers are being utilized—farm magazines, state farm papers, TV, radio, billboards, literature, exhibits, etc.

Much of this big, powerful campaign sells farmers on

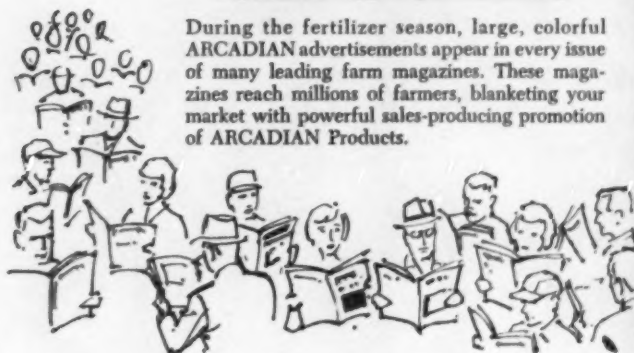
the importance of complete, balanced fertilizers. Most of the campaign is devoted to helping you sell modern, labor-saving, profit-building ARCADIAN Nitrogen materials—liquid and dry. More farmers are getting more education and more real sell this year than ever before.

It will pay you to take full advantage of this campaign by stocking and featuring ARCADIAN products. It can mean more traffic through your dealers' stores—more tonnage and more profits for you.



FARM MAGAZINES

During the fertilizer season, large, colorful ARCADIAN advertisements appear in every issue of many leading farm magazines. These magazines reach millions of farmers, blanketing your market with powerful sales-producing promotion of ARCADIAN Products.





FOR YOU ON THE **Arcadian®** LINE!

The **ARCADIAN** trade-mark is as familiar as the face of an old and trusted friend to everybody who buys and uses fertilizers. It is the well-known symbol for high-quality, nitrogen products. The biggest and most powerful advertising campaign in nitrogen history is pre-selling millions of farmers, making it easier for you and your dealers to get orders. All this advertising effort is working for you, helping you move more tonnage, if you stock and sell **ARCADIAN**!

AMMONIUM NITRATE

A-N-L® NITROGEN

**Golden URAN®, NITRANA® and
FERAN® Nitrogen Solutions**

ANHYDROUS AMMONIA

AMERICAN NITRATE OF SODA

UREA 45



HERE'S THE BIG LINE OF



When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get formulation assistance and technical help on manufacturing problems from the Nitrogen Division technical service staff. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

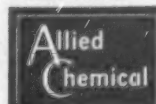
NITROGEN SOLUTIONS

	CHEMICAL COMPOSITION %					PHYSICAL PROPERTIES			
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	15
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.184	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.050	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
6C	43.0	20.0	68.0	6.0	6.0	9.3	1.180	12	39
6M	44.0	22.0	66.0	6.0	6.0	10.0	1.158	17	14
10	44.4	24.5	56.0	10.0	9.5	11.0	1.114	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.087	25	-7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.932	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.978	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	-108

Other ARCADIAN® Products: URAN® and FERAN® Solutions • Ammonia Liquor • N-dure® A-N-L® • Ammonium Nitrate • UREA 45 • Nitrate of Soda • Sulphate of Ammonia

NITROGEN DIVISION

MAIN OFFICE: 40 RECTOR ST., NEW YORK 6, N. Y., PHONE HANOVER 2-7300



Hopewell, Va., P. O. Drawer 131 Glenview 8-6301
Ironton, Ohio, P. O. Box 98 Drexel 7-4366
Omaha 7, Neb., P. O. Box 166 Bellevue 1464
Raleigh, N. C., 606 Capital Club Bldg. Temple 3-2801

Columbia 1, S. C., 1203 Gervais St. Alpine 3-6676
Atlanta 3, Ga., 127 Peachtree St., N. E. Jackson 2-7805
Memphis 9, Tenn., 1929-B South 3rd St. Whitehall 8-2692
Columbia, Mo., 1134 Highway 40W Gibson 2-4040

Indianapolis 20, Ind., 6060 College Ave. Clifford 5-5443
Kalamazoo, Mich., P. O. Box 869 Kalamazoo 5-9676
St. Paul 14, Minn., 764 Vandalia St. Midway 5-9141
San Francisco 4, Cal., 235 Montgomery St. Yukon 2-6840

Insecticide Production a Natural for Firm Serving Customers on West Coast



SIX YEARS AGO, the Cardinal Chemical Co., San Francisco, marketed its insecticides and fumigants for the food and grain industry in the immediate Bay Area only. Today, the firm ships to such widely separated places as Guam and Iran, while maintaining complete warehouse stocks in an area covering 11 of the western states, Texas, and British Columbia.

Before Cardinal began production in 1954, it was necessary for western food and grain producers to "import" their insecticides from the east. Not only did this necessitate higher freight rates, but it was difficult for western customers to work out their individual control problems because of lack of direct contact with the production center.

Today, in addition to manufacturing a complete line of pyrethrum based insecticides, stored grain and flour fumigants, custom formulations, weed and rodent control products, Cardinal maintains a variety of services whereby their representatives assist in the design, installation and supervision of insect and pest control problems.

As an example of Cardinal's unique position in the field, President James H. Hart cites the service of their technical information bulletins. At a time when problems of residual pesticides are raising questions throughout all areas of the food and feed industries, Cardinal's laboratory facilities

are more and more being used for grain testing.

Recently, within the month that a government agency issued regulations governing the use of malathion in grain, rice and bean storage, Cardinal was able to present complete details for standard dosages, methods of application and their laboratory's new sampling procedure, as well as recommendations for proper fumigation.

Due to the increasing use of malathion on long-term storage of government grain, residuals have become more and more of a problem, and Cardinal's testing program can return an analysis three days after receipt of samples. The firm is at present expanding its laboratory facilities to handle bromide residue analysis, in order to reduce the present time of one week for completion of sample tests.

An example of Cardinal's close working relationship with the food and grain industry is their recent creation of a drosophila insecticide developed expressly for California's wine industry. "Drosofo-Kill" is said to be the only non-toxic insecticide to be tested by the University of California for use within the winery.

Utilizing Cardinal's patent-applied for mixture of technical piperonyl butoxide and pyrethrins in a non-toxic carrier, "Drosofo-Kill" is mixed at one part to four of water and dispensed through an electric fogging

PESTICIDE FIRM EXECUTIVES—Ramsay Browne and James H. Hart, vice president and president, respectively, of the Cardinal Chemical Co., San Francisco. Under their guidance, the firm has grown from a local operation to the point where their products are distributed through 13 Western states, Texas, and British Columbia.

device at the rate of one gallon per 128,000 cubic feet of area. Taste tests conducted at the University of Cali-

fornia showed that any taste in the wine was first apparent only at a

Turn to **CARDINAL** page 24

CREEK-O-NITE CLAY

DUST
For Insecticide
Carriers, Diluents

GRANULES
For Agriculture
Applications

FINES
For Conditioning
Fertilizers

**PRODUCED WHERE OHIO AND
MISSISSIPPI RIVERS MEET**



**USE THIS CENTRALLY LOCATED SOURCE OF
HIGH QUALITY, LIGHTWEIGHT MONTMORILLONITE
CLAY FOR SAVINGS ON SHIPPING COSTS**

This high grade clay is available in a variety of textures to meet specific needs.



STAR ENTERPRISES, INC.
212 York Street, Cassopolis, Michigan

**SAMPLES
AND PRICES
WITHOUT
OBLIGATION**

**WRITE
TODAY!**

Send samples and data on CREEK-O-NITE:

☐ Dust ☐ Granules ☐ Fines.

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BY _____

ADDRESS _____

CITY _____ STATE _____



**Primary producers of
FERTILIZER CHEMICALS**



For more than thirty years we have manufactured highest quality nutritional trace elements for application in fertilizers and maintained a consistent program of research to further improve the quality and performance of these products—Our basic position and background in this field assures you of a plentiful supply of highest quality materials.

Our **Costs**, with combined carloads from one basic source.

Our **Costs**, save time, plant space and effort by using our custom formulated mineral mixture service—We will supply combinations of minerals suited to your particular specifications.

Our **Products** are backed with service, research and technical assistance.

Foliar Nutritional Products Include—Iron, Zinc and Manganese Compounds—**NU-IRON, NU-Z, NU-MANESE and IS-MIN-EL** a foliar applied mineral mixture.

For samples or literature, make request on your firm's letterhead.



TENNESSEE CORPORATION
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COPPER SULFATE
IRON SULFATE
MANGANESE SULFATE
MANGANOUS OXIDE
MINERAL MIXTURES
ZINC SULFATE

What's New?

Additional information is available about new products, new services, and literature described in this department. Circle the numbers of items on which you desire more information, fill in your name, your job title, your company's name and address on the card. Then clip it out of the page and mail. No postage is necessary.

No. 9191—Tractor-Shovel

The Frank G. Hough Co. has announced a tractor-shovel of a size and type never before available in its "Payload" line. The new model, H-30, has an operating capacity of 3,000 lb. and is equipped with a 1 cu. yd. bucket. The unit features four-wheel-drive, the company's full power-shift "Paylomatic" transmission with matched torque-converter and



three speed ranges in each direction. It is powered with a 77½ h.p. heavy-duty gas engine; has an 8 ft. 4 in. clearance under the cutting edge with the bucket in dumped position, and a 29 in. dumping reach ahead of the front tires. It features four-wheel hydraulic brakes which are sealed to keep out dust and dirt. For more information, check No. 9191 on the coupon and mail.

No. 9190—Brochure On Clay Products

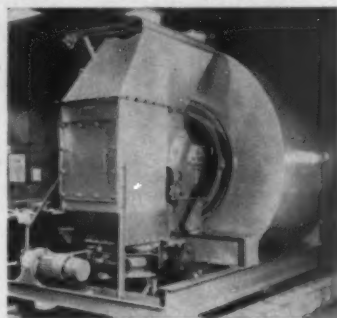
Star Enterprises, Inc., has announced the availability of a descriptive brochure on its line of "Creek-O-Nite" Clays used in the agricultural chemical industry in formulations of chlordane and heptachlor and as fertilizer conditioners. The brochure presents analytical data on the montmorillonite material, describing it as a natural fuller's earth. It is mined at Olmsted, Ill., and is available as dust for insecticide diluents, in granules for agricultural applications and as fines for conditioning fertilizers. Copies of the brochure can be obtained by checking No. 9190 on the coupon and mailing to this publication.

No. 9199—Coupler Bulletin

A four-page bulletin on "Kamlock Quick Couplers" and other equipment for handling liquid nitrogen is now available from OPW-Jordan Corp. Bulletin F-31 RE is also a condensed catalog and illustrates Kamlocks, Fill Tank Connections, Line Strainers, Sight Glass Indicators, Swivel Joints and Nozzles, all specifically designed for use with liquid fertilizers. The bulletin illustrates and describes in detail the composition, safety features, applications and prices of the components. For copies, check No. 9199 on the coupon and mail.

No. 9192—Blender, Hopper

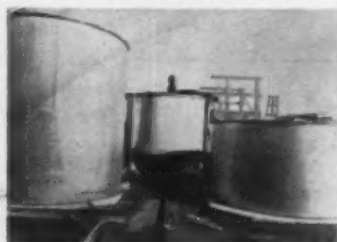
An automatic rotary blender and hopper, on a movable bed, has been introduced by Sturtevant Mill Co. According to the company, the unit forms a processing bridge, blending materials as they come from other processes and introducing them directly into the next. A supplemental hopper holds other ingredients to be introduced into the next process, yet keeps them from intermixture with



the blending materials until the appointed time. The company makes these blenders available in capacities of from 500 lb. to 20 tons. Hopper capacity is variable. The units are dust-tight and keep their dust seals during filling, discharging and while the blender is in transit. The entire process can be controlled from one panel. For more complete information, check No. 9192 on the coupon and mail.

No. 9194—Tank Liners

Large balloon-type tank liners, designed for the chemical processing industry, and introduced some years ago, have been used continuously for seven years, reported the Flexi-Liner Co. According to the company, the liners were originally priced for a life expectancy of four years. The materi-



als stored in the liners that were used for the seven years were 75% phosphoric acid, 40% nitrogen solutions and 20% nitrogen solutions. The report stated that the liner remained flexible and lively with no apparent effects from its exposure to the solutions stored. For information about the liners, check No. 9194 on the coupon and mail.

No. 9197—Pump Selection Bulletin

A bulletin which points out the type of pump best suited for handling of various nitrogen, aqueous ammonia and complete mixed solutions, has been announced by the Gorman-Rupp Co. The illustrated publication contains a price sheet, photographs of the eight models of pumps available from the company and performance curves for the various pumps. Specifications and photos of the pumps in use are included. For copies of the bulletin, check No. 9197 on the coupon and mail.

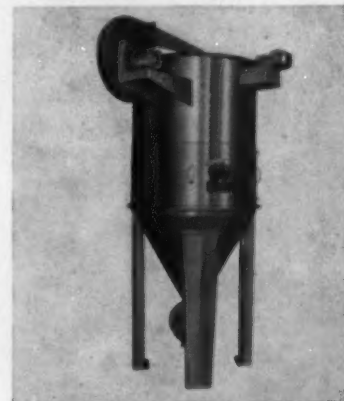
No. 9193—Consulting Service

The formation of the Joseph L. Prosser Co., Inc., as a consulting and engineering service for the plant food industry, has been announced. According to company literature, the company will be equipped to handle

the following services: preparation of feasibility studies, preliminary economic surveys, building and equipment layouts, cost estimates, final machinery arrangements designed for ease of operation and maintenance and engineering drawings and specifications required for new building construction or alterations to existing structures. The company says it is also experienced in acidulation, production of HSF, fertilizer batching and mixing, ammoniation, preneutralization, granulation including drying and cooling, milling and screening, bagged goods handling systems and nitrophosphate and liquid fertilizer plants. For details, check No. 9193 on the coupon and mail.

No. 9189—Dust Filter

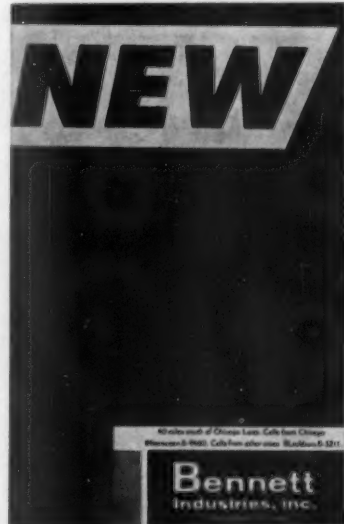
An improved design "RJ" dust filter has been added to the line of dust control equipment of the Day Co. A simplified method for maintaining the porosity of the filtering media has been added, the company says, and a reverse air pressure blower has been added. Newly designed, air-tight, quick-opening inspection doors are another feature. The filter



is available in five sizes in capacities ranging from 285 to 6,400 cu. ft. of air per minute. Larger capacities are furnished by multiple groupings. Single units are supplied with round housings, while multiple units are furnished with square or rectangular housings. More information can be obtained by checking No. 9189 on the coupon and mailing to this publication.

No. 9198—New Seam

Bennett Industries, Inc., has announced a planished side seam on all of its hi-bakz lined pails. According to company literature, a planished



side seam gives a continuous, flat, smooth surface so that linings completely coat and adhere to the planished seam. The planished seam is available in both open head and closed

Send me information on the items marked:

- ☐ No. 9186—Belt Cleaner
☐ No. 9189—Dust Filter
☐ No. 9190—Brochure on Clay Products
☐ No. 9191—Tractor-Shovel
☐ No. 9192—Blender, Hopper
☐ No. 9193—Consulting Service

- ☐ No. 9194—Tank Liners
☐ No. 9195—Belt Conveyor Idler
☐ No. 9196—Specifications Book
☐ No. 9197—Pump Selection Bulletin
☐ No. 9198—New Seam
☐ No. 9199—Coupler Bulletin

NAME

POSITION ☐ Fertilizer Mfr.

COMPANY ☐ Pesticide Mfr.

ADDRESS ☐ Both

CITY ZONE STATE

BUSINESS REPLY ENVELOPE

No postage stamp necessary if mailed in the U.S.

FIRST CLASS
PERMIT No. 2
(SEC. 34.9,
P. L. & R.)
MINNEAPOLIS,
MINN.

—POSTAGE WILL BE PAID BY—

Croplife

P.O. Box 67

Reader Service Dept. Minneapolis 40, Minn.

head palls. A brochure, with sample disks of planished and unplanished side seams, is available. For copies, check No. 9198 on the coupon and mail.

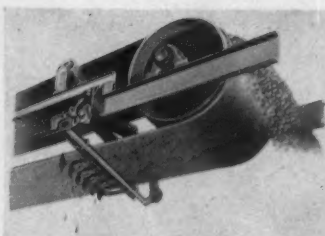
No. 9195—Belt Conveyor Idler

The Joy Series 200 Limberoller belt conveyor idler is described in a new bulletin being offered by Joy Manufacturing Co. The idler consists of a series of neoprene discs molded to a neoprene-covered, flexible steel wire cable suspended from two end-mounted bearings, the company says. On the new model, cable strain is reduced by free swiveling bearing

mounts and extra reinforcement between end discs. The bulletin contains specifications, description of construction features, installation features, installation photographs, application instructions and an explanation of advantages. For copies, check No. 9195 on the coupon and mail.

No. 9156—Belt Cleaner

Stephens-Adamson Manufacturing Co. announces the "Spring Type Belt Cleaner," designed to clean sticking material from high speed conveyor belts. The cleaner consists of a row of thin, spring steel wiper blades, each with an individual pressure

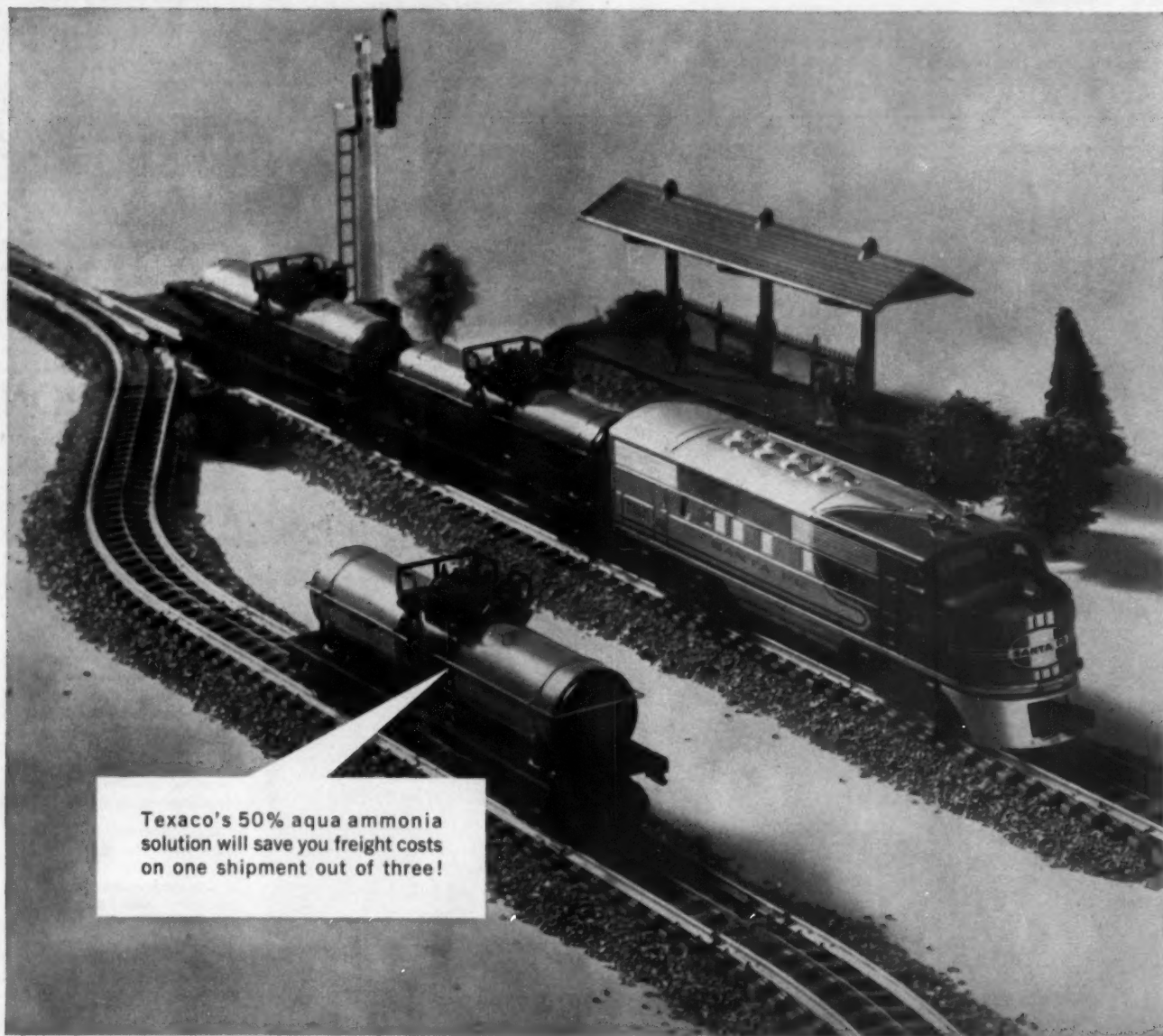


spring. The wiper blades are set perpendicular to the belt surface, but diagonal to travel of belt. As the belt passes over the cleaner, each blade wipes a path clean and dry, the company says. As the blades overlap, the entire carrying surface is covered.

For additional information, check No. 9156 on the coupon and mail.

No. 9196—Specifications Book

A specifications booklet has been published by Chippewa Plastics Co. The booklet contains complete specifications for all standard films, including general films, overwrap and high impact films. Other information contained includes packaging and marking specifications, schematic drawings illustrating roll put-up, charts and formulas for calculating yields and standards for all Chippewa films. For copies, check No. 9196 on the coupon and mail.



Texaco's 50% aqua ammonia solution will save you freight costs on one shipment out of three!

Don't pay freight on water when you buy ammonia!

When you buy Texaco's new 50% aqua ammonia solution instead of the standard 29.4% solution you get the equivalent of free freight charges on one shipment out of three!

Texaco's new 50% NH_3 solution gives you 57% more ammonia than the same volume of regular 29.4% solution. You save shipping costs on one tank car out of three.

When 50% solution arrives at your plant, you can dilute it to 29.4% without additional investment in handling equipment.

Only Texaco offers you this saving! For more information on this ammonia solution or any other high-quality Texaco petrochemical, call or write Texaco Inc., Petrochemical Sales Division, 332 South Michigan

Avenue, Chicago, Ill., or 135 East 42nd Street, New York 17, New York.

Tune In: Texaco Huntley-Brinkley Report, Mon. Through Fri.-NBC-TV



TEXACO
PETROCHEMICALS

TEXACO PETROCHEMICALS: Aqua ammonia, anhydrous ammonia, nitrogen solutions, diisobutylene, odorless mineral spirits, naphthenic acid, propylene tetramer and rust inhibitors.



H. L. Martin, Jr.

Allen Jaeggi

S. D. Ward

A. F. Vetter

E. M. Foster

Production Changes Made By American Agricultural Chemical Company

NEW YORK — Several changes have been announced in the production staff at the American Agricultural Chemical Co. by D. S. Parham,

vice president in charge of production.

H. L. Martin, Jr., former general maintenance superintendent, was named manager of the engineering and construction division. He replaces Roy Simm, who retired after 45 years service with the company.

Allen Jaeggi, a member of the pro-

duction and engineering departments since 1949, was named assistant manager of the engineering and construction division.

S. D. Ward, former Northeast division superintendent, becomes assistant general superintendent for fertilizer production. He will assist R. M. Richey, general superintendent.

A. F. Vetter, former Northeast division maintenance superintendent, was named maintenance superintendent. He will also be responsible to Mr. Richey.

E. M. Foster, former foreman at the company's Cleveland plant, becomes assistant superintendent at that location.

CARDINAL

Continued from page 21

concentration of ten times that necessary to kill the insects in the winery over open vats.

Technical liaison between Cardinal and the industry is handled through Joseph Francis O'Brien, who secured his master's degree in entomology from Oregon State College, and James C. Allen, former technical director of the Dried Fruit Assn. of California, and a holder of a master's degree in sanitary science from the School of Public Health at the University of California. Mr. O'Brien is staff entomologist, Mr. Allen is the firm's sanitation consultant rendering technical assistance to the food processing industry.

Distribution of Cardinal chemicals in Northern California is handled through the firm's home office, while in the Northwest Van Waters & Rogers is the distributor. In the Rocky Mountain area and the Southwest, Cardinal products are handled by the Braun Chemical Co.

ADDITIONS

Continued from page 16

pesticide problem. Although there were some initial difficulties, emulsifying agents were soon made available which give a stable, uniform emulsion of almost any toxicant in the various types of liquid fertilizers. The general practice is to mix the pesticide concentrate with the fertilizer in the field rather than at the plant.

The concentrate is usually added after the liquid fertilizer is loaded in the tank truck ready for delivery to the farm, or it can be added to the applicator tank by the farmer. Since only slight agitation is required to form the emulsion, the shaking occurring during hauling is sufficient to give a uniform mix.

This procedure has some advantages over the plant mixing practice in the solid fertilizer industry. One of the major ones is that the type of pesticide and proportion between pesticide and fertilizer can be varied widely to suit specific farm conditions; if the mix is made at the plant either flexibility is sacrificed or the manufacturer must make and store a variety of mixes.

Another advantage is that the pesticide is sold separately and dumped in after the customer has bought the fertilizer. In most states this has avoided the problems of additional registrations for fertilizer-pesticide mixtures.

Dow Promotes Two

MIDLAND, MICH.—The advancement of G. J. Williams to a new position as assistant general sales manager of the Dow Chemical Co. is announced by Donald K. Ballman, vice president and director of sales.

Mr. Williams has held the post of sales manager of the plastics department since 1958.

At the same time, Mr. Ballman announced the promotion of Arnold A. Butterworth to succeed Mr. Williams in the plastics department position. Mr. Butterworth has served as assistant to the sales manager, plastics department, since 1957.

Mr. Williams joined the company in 1948 and Mr. Butterworth has been with Dow since 1946.

quality fertilizer begins here...

UNIFORM GRANULE SIZE

FREE FLOWING

with TRONA'S* new, specially-sized granular POTASH

Quality fertilizer granulation begins with Trona's all-new, specially-sized granular muriate of potash. The carefully regulated and controlled screen size results in reduced segregation and uniformity of finished product. Whatever your mixing method—batch or ammoniation, Trona's new granular assures a quality fertilizer uniform in particle size.

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*TRADEMARK AND TRADENAME OF TRONA

Producers of: BORAX • POTASH • SODA ASH • SALT CAKE • LITHIUM • BROMINE • CHLORATES
PERCHLORATES • MANGANESE DIOXIDE and other diversified chemicals for Industry and Agriculture



“I’m a
bag that
gets knocked
around a
lot in my
business.”



“Me, too. And I don’t think I could stand it if Chase didn’t know
how to pick the paper!” Fact! Chase buys all these types of paper
on the open market: stretchable, non-skid, creped or regular kraft...fully bleached, semi-bleached
and colored outer sheets. This means Chase has the pick of the best from *many* sources. Result: Bags
with maximum strength, minimum bulk, more value for you. You pay no more for the *best* bags,
beautifully printed. Make sure you
get them—from Chase!

CHASE BAG COMPANY

355 Lexington Avenue—New York 17, N. Y.
32 Plants and Sales Offices Coast to Coast

MULTIWALLS • TEXTILE • PLASTIC AND LAMINATED BAGS • CONSUMER-SIZE PAPER BAGS
AND OTHER PACKAGING MATERIALS

QUESTIONS—ANSWERS

From You

QUESTION: My problems in formulation are two: (1) I would appreciate your supplying me with literature or informing where information concerning pesticide emulsions can be obtained. Also information on wettable and soluble powders.

ANSWER: Many of the emulsifier producers have good booklets with information about emulsification.

These are all quite informative.* Good emulsifying concentrates of pesticides are obtained by using a blend of non-ionic and anionic emulsifiers. These two types may be used for most of the insecticide materials. However, for the best emulsions of the organic phosphates such as Parathion, Malathion, EPN, etc., a special emulsifier does a better job.

In the first case, a special formulation is required for each system to

*A list of companies was sent to the inquirer with the suggestion that he contact them for further specific information.

From Experts

be emulsified using the correct (or best) ratio of these two types of emulsifiers.

For the anionic, an alkyl aryl sulfonate may be used, and for the non-ionic, one of the ether-alcohol types.

The good, reliable emulsifier firms will furnish mixtures of these two types with adequate instructions for their use but the most flexible and economical method is to do the blending oneself if many different systems (different solvents or active materials) are involved. Personnel of one supplying firm has made a study of

emulsifiers needed for liquid fertilizers (concentrated insecticides to be mixed with strong salt solutions). It is a very difficult problem.

QUESTION: What is your opinion of results we have been getting in a Poulson mill with a Mikro Pulverizer 3 TH type, using .027 screen for 40% DDT and 64 screen for 20% tox.-10% DDT. (20-10) Here are the results we get:

	40% DDT	20-10
Held on 100-mesh screen	7.8%	1.2%
Held on 200-mesh screen	15.0%	4.2%
Passed through 200-mesh		Rest went through

Screen perforated, 1/32nd" hole for 20-10. Screen Herringbone, 3/64ths size hole. We first passed the DDT 100% with "Attaclay" and obtained above results using herringbone screen. Next, we obtained the 20-10 results with the perforated screen. The rate of feed was about 4,000 lb./hr. Do you consider that too fast?

ANSWER: The fineness of a grind of a pesticidal powder depends upon the use to which it is to be put. A seed treatment powder does not need as small a particle-size as does a "wettable powder." The latter should be ground as fine as possible because the active ingredient should remain in suspension for a reasonably long time, so it may be used with equipment not having agitation, and also that the active ingredient may be more uniformly applied.

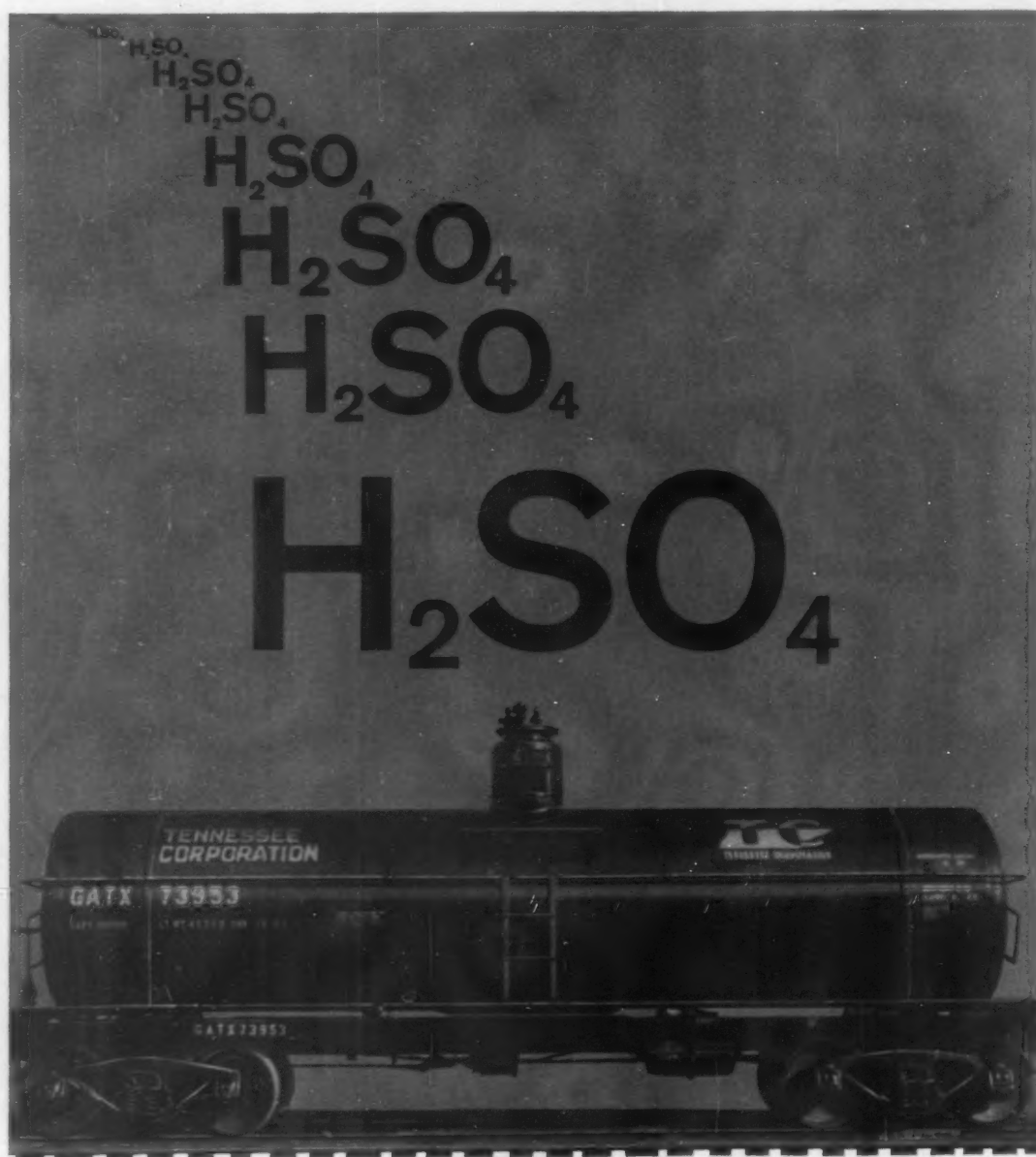
There is a difference in the usefulness of screens in the making of powdered pesticides. A coarse screen used in the milling process can remove only foreign matter such as wood chips, paper, string, iron objects, etc. It could also remove some of the poorly-ground active ingredient, in which case the product would be low in analysis.

In what is called a "screen mill," such as the one you must have, the screen in the mill does no grinding and it does practically no classifying, such as is needed here. A finer screen simply holds the material in the mill a little longer than a coarser one would, allowing a little longer for the hammers to operate on the particles.

The testing screen shows what the mill has accomplished. Most of the inert ingredients such as diluents are generally obtained sufficiently fine that nearly all will pass through a 200 mesh sieve so that anything left on such a screen will be practically all active ingredient. It is doubtful whether a No. 100 sieve has any place in the testing of agricultural pesticide powders. Too coarse. Any well-ground powder for this purpose should nearly all pass through a No. 200 sieve, and that is a maximum for particle size.

A "dry sieve test" is possibly best and quickest but when finer screens, such as a No. 325, are to be used, it becomes necessary to use the wet method. For the dry method, the shaking should be uniform between tests.

The rate of grinding must be determined from the degree of particle reduction wanted and the equipment available. Ordinarily, the slower the grinding (or milling), the finer will



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TENNESSEE CORPORATION

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EDITOR'S NOTE: Questions on this page were sent to Croplife by Will Dalton, plant manager of Cotton States Chemical, South America, Managua, Nicaragua. Answers were provided by Lee H. Ayres, for many years associated with McConnon & Co., Winona, Minn. We invite additional questions from Croplife readers. Address questions to: Editor, Croplife, P.O. Box 67, Minneapolis 40, Minn.

be the product, within the possibilities of the mill.

Sometimes dry ice (broken in small pieces) is used in the mixture when low melting substances are present, to make them more friable and hold the mill temperature lower. Of course, this increases the cost but is necessary with some materials.

QUESTION: I should also like to have information on solvents and chemical characteristics of these, leaning on the technical side rather than solvent qualities, flash point, etc. Why do xylene-range solvents require emulsifiers different than those used with heavy aromatic naphtha type?

ANSWER: The various suppliers of petroleum solvents will supply ample specifications for their products. A solvent is selected for a certain use by reason of its flash point, rate of evaporation, crops on which it is to be used, solvency at the desired temperature, and other properties.

Results seem to indicate that the more volatile an oil is (the quicker the evaporation) the less will be the phytotoxicity (leaf burn, killing of the plant, etc.). It is also thought that the pure paraffinic oils are less harmful to plants and foliage than the aromatics.

When any change is made in solvent or active ingredient in a formulation, the emulsifier must be examined and in most cases changed. It is difficult to say why this is so.

The different solvents and active ingredients can be emulsified nicely and economically because of reduced inventory, by the method of blending described in the first answer.

Commercial Solvents Offers New Low-Moisture Nitrogen Solution Line

NEW YORK—Commercial Solvents Corp. has announced a new line of water-free nitrogen solutions under the trade name of "Dri-Sol." The makers state that the water content of the new solutions is one-half of one percent. Patents covering the new product line have been applied for, CSC states.

The new materials are made for use by fertilizer manufacturers in preparation of mixed plant foods, and the solutions are available in grades ranging from 24% ammonia and 76% ammonium nitrate, to equal parts of each. CSC says that "Dri-Sol" properties are very similar to those of conventional ammoniating solutions containing 6% to 12% water.

Loy A. Everett, manager of Commercial Solvents' agricultural chemicals sales department, says the elimination of "expensive water" reduces shipping costs and eliminates production stoppages resulting from the presence of more water than the processes involved can handle.

Other advantages, Mr. Everett points out, are convenience of use and compatibility with processes and procedures generally utilized in mixed fertilizer production.

In extensive plant trials during the past two years, Dri-Sol solutions are reported to have given effective control over the liquid phase and other aspects of mixed fertilizer production. CSC says that in granular fertilizer production, the new solutions make it easier to cope with temperature variations and high moisture content of superphosphates and other raw materials. The products also permit the introduction of water when needed at the time of production.

"Dri-Sol" ammoniating solutions were developed at the firm's research laboratories in Terre Haute, Ind., by a team of agricultural chemical research scientists and market development personnel. The products are being manufactured at the company's plant at Sterlington, La.

New Plant Engineer

CARLSBAD, N.M. — William N. Holzmann has been appointed manager of plant engineering at the Carlsbad operation of International Minerals & Chemical Corp., according to E. C. Skinner, operations manager.

He succeeds L. H. Bunnell, recently retired, and will be responsible for all engineering, design and construction of chemical facilities as well as all maintenance work, both on the surface and underground.

He formerly was service design engineer with Escambia Chemical Corp., Pensacola, Fla.

KENTUCKY FERTILIZER SALES

LEXINGTON, KY. — Kentucky dealers sold 62,564 tons of fertilizer during January, 1960, reported the Department of Feed & Fertilizer, Kentucky Agricultural Experiment Station. This compared with 56,608 tons for the same month in 1959.



PLANT FOOD GROUP—Members of the newly-formed Kansas Plant Food Council are shown at the recent second meeting of the group at Kansas State University, Manhattan. Seated, from left, are Rom Hruza, Allied Chemical Corp., Omaha, Neb.; F. W. Smith, K-State agronomist; A. H. Stephenson, Consumers Co-op, Kansas City, Mo.; Bob Easley, Olin Mathieson Chemical Co., Manhattan, and Arian Woltemath, National Plant Food Institute, Kansas City, Mo. Back row: R. V. Olson, head of K-State agronomy department; Gene Cleavinger, extension agronomist; Bob Guntert, control division, Kansas state board of agriculture, Topeka; G. A. Wickstrom, American Potash Institute, Columbia, Mo.; Dean McHard, Kaw Fertilizer Service, Topeka; F. L. Douthit, W. R. Grace & Co., Emporia, and Robert Bohannon, extension specialist in soil testing. The council supports and encourages educational activities concerning use of fertilizer in Kansas.

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It's been more than three years since Bemis perfected the DUETTE, the multiwall bag valve-on-a-valve that gives double sift protection for granular, pelletized or pulverized products.

In that time, DUETTE Multiwalls have been used by many of the leading chemical and fertilizer manufacturers, with consistently gratifying results. The diagrammatic pictures show why . . .



WON'T CLOG . . . The Magic Yellow check flap falls freely aside from the valve slit. The sleeve won't choke or clog the packing spout.

POSITIVE CLOSING ACTION . . . This diagrammatic picture shows the action as the Magic Yellow flap starts to close over the valve slit.

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How To Improve Sewing Machine Operations

By Arthur Nichols
West Virginia Pulp & Paper Co.

Not too long ago I visited a new plant equipped with the newest machines for sewing multiwall bags. As the foreman proudly showed me the operation, he remarked, "This is one of the most efficient operations of its kind in the country."

My answer came as a surprise to him. I said, "Yes, Joe, you have a very modern plant, but I can see a number of things wrong with the adjustment of your sewing and conveying equipment, and the way they are being operated. If these things are

corrected, your efficiency can be increased by at least 50%."

This is not an isolated case. Our experience over the years has shown that there is hardly a plant in the nation where the sewing machine operation cannot be greatly improved. As a matter of fact, by following a few simple rules, bag breakage and product losses totalling millions of dollars annually can be materially reduced.

Let us get down to a few specifics: It has been proved in the field that

properly sewn bags will outperform bags improperly sewn by at least five to one. We also have discovered that a great majority of "bags are improperly sewn," causing a high percentage of bag breakage at the customer's operation.

Let us list some of the things that can happen when the sewing machine operation is not efficient.

1. Improper tension of thread.

Result: Tight stitches, causing thread to cut into paper, thereby weakening the bag and causing it to rupture along the sewing line.

2. Improper number of stitches.

Result: Too few stitches cause sifting or leakage of product. Too many stitches cause weakening of bags. The recommended stitch per inch is 3.0 to 3.5.

3. Slippage of "feed dog." This is caused by too little or too much

pressure on the pressure foot spring.

Result: Too little pressure causes slippage of feed dog. Too much pressure forms a bind which interferes with proper feeding of bag. (A dull feed dog may react in a similar fashion.)

4. Improper timing between sewing head and conveyor belt.

Result: Sewing line becomes uneven. This causes an unequal weight when bag is filled, increasing bag breakage.

5. Binding of tape (when tape is used).

Result: Tape will bind in folding mechanism, causing digging of "feed dog" on tape, even though feed dog is sharp.

6. Dirty machines.

a) Result: Where lint deposits build up in grooves of feed dog, there is an undue strain between the feed dog and throat plate, causing unnecessary wear.

b) Result: Where there is an accumulation of lint and product around the moving parts, oil lines may plug, causing "freezing" and breakdown of equipment.

Since West Virginia organized its multiwall bag division about a year and a half ago, we have analyzed just about every kind of plant in the country which fills and closes bags.

Much to the happy discovery of most managements, solutions to these

EDITOR'S NOTE: Mr. Nichols is manager of the sewing machine clinic service of West Virginia Pulp & Paper Co.

sewing machine problems, which are not self evident, are surprisingly simple, and the reduction in bag breakage and product loss surprisingly large.

It takes long experience, however, to be able to detect trouble spots, because many are not easily detected on the surface. Also, once a trouble area is spotted, the trick is to know just exactly what to do to overcome it.

Contract Let for New Indian Fertilizer Unit

LONDON, ENGLAND — Simon-Carves, Ltd., of London, have received from the East India Distilleries & Sugar Factories, Ltd., a contract to build a complete new plant to make approximately 51,000 tons per year of compound fertilizers based on ammonium phosphate.

Total cost of the plant is expected to be in the region of \$9 million.

In addition to the compound fertilizer plant, the factory will include units for production of synthetic ammonia, sulphuric acid and phosphoric acid, together with equipment for handling incoming raw materials and outgoing finished products. The factory is to be built at Ennore near Madras, India, and is expected to come into production in two years.

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Boss of a "Penny-Pinching Brain"

He heads up the Phillips 66 Electronic Computer Service that is proving so effective in working out "penny-pinching" fertilizer formulations for Phillips 66 mixer customers. Although the savings may be only pennies per ton, they can run into thousands of dollars a year.

For example, using the electronic "brain" resulted in a sizable profit increase for one fertilizer manufacturer. He supplied Phillips with an analysis of his materials, the grades of fertilizer and amounts of each he wished to make. The production schedule and formulations figured out by the Electronic Computer saved him from 30 cents to \$1.50 per ton on material costs.

The net saving during the year came to almost \$15,000.

Computing formulations is not the only way Phillips can serve you. Phillips advertising and sales aids promote farmer-dealer cooperation and increased use of mixed fertilizers. Phillips will also help in sales and industry meetings for your salesmen and dealers . . . provide skilled technical assistance . . . and, of course, give you dependable delivery on high quality Nitrogen solutions, Anhydrous Ammonia, Ammonium Nitrate, Ammonium Sulfate, and Triple Superphosphate. If you have a formulation problem, call or write the nearest office listed below.

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Study Reactions of Men in Plant To Find Basis of Most Accidents

By G. F. MacLeod

Food Machinery & Chemical Corp.
Niagara Chemical Division
Fresno, California

IN DAYS WHEN a thousand tongues and many millions of words clamor for attention from one's ears and eyes, it seems imperative to clearly set forth reasons for any discussion. So it is with safety in fertilizer manufacturing. Is there a safety problem in this field?

The answer is definitely "yes." According to well founded statistics, the explosives industry has an accident rate of 1.34 disabling injuries per million work hours. The chemical industry has 3.55, but the fertilizer industry produces 8.27 disabling injuries per million hours worked. There is obviously a problem to be considered.

It is not necessary here to relate all of the implications of such a problem. Without in any way minimizing the needs for special safety studies, the involvement of any needed safety devices or the promulgation of safety procedures, it is pertinent to look at man, the accident maker.

Certainly, it is too obvious to say that without men there would be no accidents. Eighty percent of our accidents are caused by workers while the remaining 20% are mechanical failures. This further focuses our attention on men in accidents and suggests added reason for studying the men who comprise the working force in fertilizer plants.

As a generalization, one can assume that men who work in fertilizer plants are much like any other cross section of our population. They are not different. They are subject to the same stresses, respond in a characteristic manner and become involved in accidents common to all workers.

If it is possible to study the personal characteristics of our workers, anticipate their actions, and know the reasons for them, we may be able to prevent costly accidents and improve the costly, smudgy record of our industry.

There are 10 basic fears on which men concentrate. While thus concentrating they may become accident prone. If the threshold of their individual tolerance of these stresses is exceeded, they react in definite patterns, most of which are dangerous while they are at work.

These are the stresses to watch for:

1. Threats to life or health.
2. Threats of pain—heat, cold, injury, etc.
3. Threats of loss of subsistence—job, money, property.
4. Sexual deprivation.
5. Threat of enforced idleness.
6. Threats of restriction of movement.
7. Threats of being isolated.
8. Threats to relatives or friends.
9. Fear of dislike, rejection, ridicule.
10. Fear of incompetent, capricious leaders.

Only rarely do these factors operate singly, although any one or combination may become paramount at any time. There are three common augmented disturbances:

1. Frustration of goals, needs or desires.
2. Conflicts between mutually desired objectives.
3. Disorientation—uncertainty or confusion about what may or will happen.

When any one of these stresses or

any combination of them becomes great enough to exceed an individual's tolerance, he reacts in one of several ways. From most desirable to least desirable, these reactions may be grouped as follows:

1. Reasoned, coordinated, logical action to remove the stress.
2. Random trial and error efforts to escape.
3. Emotional, angry, undirected

acts, accompanied by hatred, suspiciousness, hostility, etc.

4. Withdrawal to a fatalistic, sullen, apathetic attitude of disregard.

It should be noted that this sequence of events, while it may not be all-inclusive, embraces many common characteristics of all men whether they be plant workers, office workers or management. Further, not all of these events occur during the same

period, nor do they stem necessarily from working conditions.

It is equally apparent that when reaction takes place, by careful study and recognition of the causes, a worker may be helped to overcome his difficulty by reasoned advice.

As we study the cause of safety, working with every possible mechanical and procedural tool, it seems reasonable to study equally carefully the major ingredient of our accident potential. Surely a man's attitude toward and on his job can reflect a state of mind which creates accident proneness.

To know one's fellow workers is a continuous job—one of eternal vigilance. It is far more difficult than spotting the potential hazard in a plant, but it is equally important in the furtherance of safety programs. To ignore the reactions and temperament of a worker is to overlook man as the accident maker.



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TEXAS FIRM

Continued from page 2

then write out fertilizer recommendations."

The company hauls many of the ingredients from the Gulf Coast on return trips from grain hauling. At present the plant has eleven tanks holding 10,000 gallons each, in addition to nearly unlimited track storage in railroad cars.

In mixing the ingredients, the potash is augered into the reactor, while ammonia is first mixed with water then pumped into the reactor. Mr. Stone says that though some firms put the ammonia in directly he believes his method prevents some nitrogen loss.

"Heat is always a problem," he

said, "so we are trying something new. Inside the reactor we have many yards of coiled pipe through which water is pumped for cooling. Now we are building a high tower and have hundreds of two by four boards over which the water will trickle on its way down from the top. As it filters over these boards, a huge electric fan will send a blast of air inside the tower to cool the water further.

"As the water finally reaches the bottom of the tower it will drain into a vent and then into the pipe and be pumped back through the coils again. Tests have shown this will reduce the heat considerably."

The fertilizer plant works with dealers and also with large farmers.

The company has 32 dealers in Texas and New Mexico, and is now selling fertilizer as far as 300 miles away. Each dealer is furnished with three tanks of 10,000 gallons capacity each, to hold three different kinds of fertilizer. Some large farmers, typified by one man who has 13,000 acres of cropland, are also loaned tanks for on-farm storage.

The tanks are filled from eight large transport trucks which hold around 3,500 gallons each.

Mr. Stone attributes the first year's success partly to the company's educational and research program. It has three outside salesmen who work with dealers and large farmers. The firm is co-operating with the Texas extension service and Lubbock Experiment Station on many on-farm demonstrations. By furnishing some fertilizer free of cost, the company has learned several facts from last

year's demonstration and built up some good will among farmers.

"A fertilizer plant must stay as modern as tomorrow," says Mr. Stone, "and research is the only way to stay up. Right now I'm convinced our soils have reached the point where trace elements will soon be needed. So we are beginning to work with magnesium and other minute elements. Before long we plan to use some of these additives and put them out on experimental plots."

Another plan that will be started soon is making small packaged goods for nurseries and greenhouses. These will be sold not only by the plant's regular dealers but also by feed and farm stores, garden centers and other businesses.

Frank Seeland Elected Dr. LeGear President

NEW YORK—At a meeting of the board of directors of Dr. LeGear, Inc., St. Louis manufacturer of proprietary animal health products, Frank Seeland was elected president of the firm. The former president, Dr. Daniel H. LeGear, is retiring for reasons of ill health.

Mr. Seeland will continue as vice president in charge of the farm chemical and insecticide division of S. B. Penick & Co., New York, which last November acquired controlling interest in Dr. LeGear, Inc.

A member of the Penick organization since 1952, Mr. Seeland was elected vice president in 1955.



Frank Seeland

U.S. Borax Appoints New Senior Scientist

LOS ANGELES—Appointment of Dr. Irving S. Bengelsdorf as a senior scientist for the U.S. Borax Research Corp. was announced by Dr. C. L. Randolph, vice president of the Anaheim, Cal., subsidiary of U.S. Borax & Chemical Corp.

Dr. Bengelsdorf, who has been assigned to the industrial boron products research department, has held a variety of research positions in the field of organic chemistry, including postdoctoral research under Prof. Linus Pauling at California Institute of Technology, two years on the faculty of UCLA, and research positions with General Electric and Texas-U.S. Chemical Co.

A graduate of the University of Illinois, Dr. Bengelsdorf earned M.S. and Ph.D. degrees in chemistry at the University of Chicago.

ON THE FERTILIZER TICKET

TALLAHASSEE, FLA.—Fertilizer entered the political arena in the race for commissioner of agriculture when Doyle E. Conner, a candidate, said, if he is elected, growers would get what they pay for when they buy commercial grades.

He told a meeting of the State Association of County Commissioners that he would install a system of microscopic analysis of fertilizers.

In recent years, he said, there have been complaints from growers, especially tobacco farmers, that manufacturers have substituted cheaper materials.

A microscopic analysis, Mr. Conner said, would not only help the grower but would protect the "honest manufacturer."

Tailored to keep you ahead of the high-analysis trend

SOHIOGEN[®] SOLUTIONS

READY SUPPLY TO MEET YOUR NEEDS



READY SERVICE TO MEET YOUR SCHEDULES



With changes coming at a startling rate in the fertilizer business, just keeping up with them can be a problem. But Sohio keeps its customers ahead of the trend to high-analysis fertilizers by tailoring solutions to the times.

Sohio specialists who work with you match your requirements from a full line of SohioGen solutions and Sohio nitrogen materials — ammonia, ammonium nitrate, and urea — blended to a wide range of chemical and physical properties.

Technical help. The right material for your job. Johnny-on-the-spot delivery. All add up to fewer problems and lower production costs at your end of the line. Ask your "Man from Sohio" for the full story.

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Higher nitrogen content solutions (concentrated solutions containing less water).

Higher fixed-to-free ratio solutions (solutions containing higher ratio of salts to ammonia).

Development of new solutions to satisfy specific needs for higher fixed-to-free ratio solutions.

Addition of urea to lower saturation temperatures (making it possible to use special solutions).

Full technical assistance and service in using more solutions for production of fertilizers.

Development of solutions adapted to preneutralization.



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New Moisture and Air-Tight Multiwall Bag Developed for Fertilizer Manufacturers

SAVANNAH, GA. — Commercial production on a new heat sealed, moisture and air-tight multiwall bag has been started at its Savannah plant by Union Bag-Camp Paper Corp., the firm has announced. The new package was made previously only on a pilot plant basis.

The "Uniseal" bag was first introduced ten months ago as a solution to the problem of packaging hygroscopic, deliquescent, corrosive, semiliquid or other hard-to-protect products. Designed to hold up to 100 lb. of bulk product, the bag is constructed in the form of a tube from two to six plies of paper. The inner ply is coated with polyethylene or other heat sealable materials, the company says. Depending on the protection needed for the product being packaged, the plies are made up of various combinations of kraft paper, kraft and foil or polyethylene-coated kraft and foil.

Among the features of the new development is one that staggers or offsets the outer plies of the bag, leaving the inner ply exposed to take a direct heat seal application. Previously, it was often impractical to heat-seal the inner ply of a multiwall bag as the seal had to be made through all the paper plies.

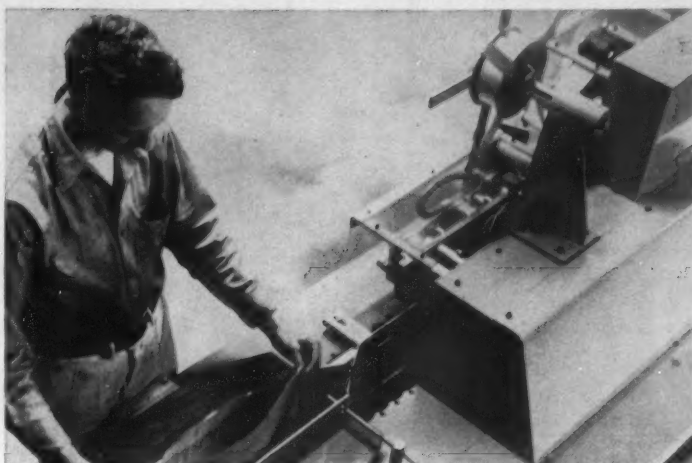
The makers say the vertical seam and the bottom of the inner ply are heat-sealed by the bag manufacturer. The top of the inner ply is heat sealed by the bag user, after the bag is filled, with a special closing machine also developed by Union-Camp. After heat sealing the top of the inner ply, the closing machine then applies adhesive to the tops of the outer plies. The entire lip is then folded over and pasted to the outside of the bag so that no pressure is exerted on the heat seal. Simultaneously, the ma-

chine adds a strip of 2½ in. width tape, centered over the edge of the lip.

The customer closure effected by this special machine duplicates the factory closure on the bottom of the bag. The machine heat seals, pastes the lips and applies gummed tape at the rate of six filled bags a minute.

Union Bag says that its change from pilot plant to commercial production of the new bag resulted from increased interest in this type of container by shippers of ammonium nitrate and other fertilizer materials as well as by manufacturers of various chemical products.

Savings on container costs and on shipping and storage space are also among the advantages outlined by the maker.



NEW BAG-CLOSING MACHINE—Over-all view of bag closing machine for new heat-sealed, moisture and air-tight multiwall bag now in commercial production by Union Bag-Camp Paper Corp.

Newest member of the Davison team of granulated phosphates...



DAVISON Diammonium Phosphate

MAKES HIGHER ANALYSIS MIXTURES . . . than before—and makes them more easily. 16 units of highly soluble NITROGEN—Plus 48 guaranteed units of AVAILABLE P_2O_5 . **FOR DIRECT APPLICATION . . .** an exact 1-3-0 ratio—ready to use and sell . . . beautifully granulated.

FOR DRY MIXING . . . Davison Diammonium affords the dry blend manufacturer the advantages of an ammoniation plant. A balanced 1-3-0 ratio simplifies formula calculations.

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Some formulations of ratios in higher analysis grades using DAVISON 16-48-0

Ratio Analysis	Pounds of Material Required			
	16-48-0	Ammo. Sol. (21%N)	Triple (46% APA)	Potash (60% K ₂ O)
1-1-1 14.4-14.4-14.4	602	917		481
1-2-2 11.22-22	917	349		734
1-4-2 8.5-34-17	1063		370	567
1-4-4 6.6-26.3-26.3	828		390	882

*Other higher analysis nitrogen materials (urea and ammonium nitrate) may be substituted in above formulations. Analysis in the more popular ratios, such as 12-12-12, 10-20-20, 6-24-12, 5-20-20, can be manufactured by the addition of granular dolomitic limestone or other materials.

Caustic Plant Construction To Start in Canada

CORNWALL, ONT.—Construction of the caustic potash plant of Canadian Industries Ltd., to be located on the site of the company's Cornwall works, will commence April 18, Frank M. Robertson, works manager, announced.

Contract for the plant, which will cost about \$500,000, has been awarded to Fraser Brace Engineering Co. (Ont.) Limited. Some 80 men will be employed on the project at the height of construction, most of whom will be hired through the Cornwall offices of the National Employment Service. Completion of the plant is scheduled for early fall.

Caustic potash is an important ingredient in the manufacture of the latest heavy-duty soaps and detergents. It is also used in liquid fertilizer manufacture, oil refining and in a number of other industries.

The plant will be the first in Canada to make caustic potash and will have a capacity sufficient to meet all present Canadian requirements and those of the foreseeable future.

The building will be of concrete, brick and steel construction and one side will be tied to the main caustic-chlorine cell room of the present plant. It will consist of one-story and a full basement.

Korean Urea Plant Starts Operations

SEOUL, KOREA — Production of "snow white" quality urea fertilizer has started at the 85,000 ton-annual-capacity urea plant at Choongjoo, Korea.

Officials of the Commerce-Industry Ministry reported that the urea fertilizer produced at the plant contained only .95% impurities.

Operational efficiency of the ICA-built plant is improving rapidly, the officials said.



AFTER MANY YEARS—Two veterans of long service with American Agricultural Chemical Co., New York, recently retired. Top photo: Roy Simm (right), retiring manager of the engineering department looks over watch presented by fellow employees commemorating his 45 years of service with the company. D. S. Farham (left), vice president for production of Agrico, made the presentation. Lower photo: R. M. Rodger (right) accepts gift from R. M. Richey, general superintendent, honoring Mr. Rodger's retirement after 42 years with the company.

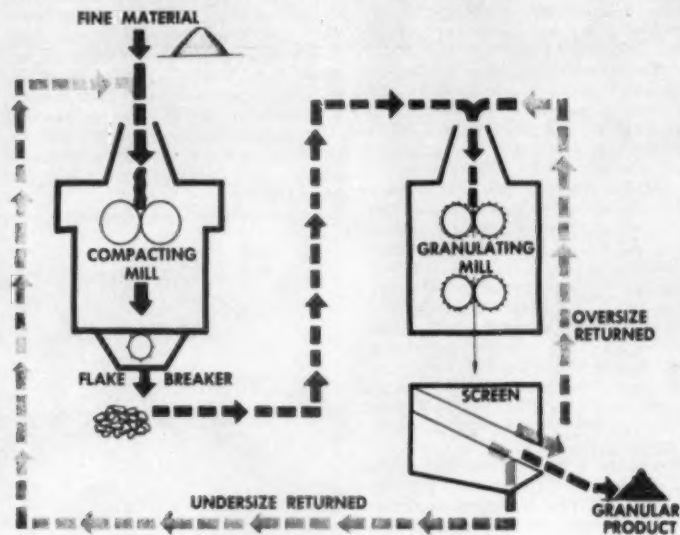
New Fertilizer Compacting System Said to Overcome Problems of Particle Segregation

MILWAUKEE, WIS.—Allis-Chalmers Mfg. Co., Milwaukee, has developed a compacting system to agglomerate fertilizer "fines" by passing them between smooth rolls under pressure. The company reports that the process has worked out well under actual manufacturing conditions in a number of fertilizer plants, and that it is presently conducting further feasibility studies into applying

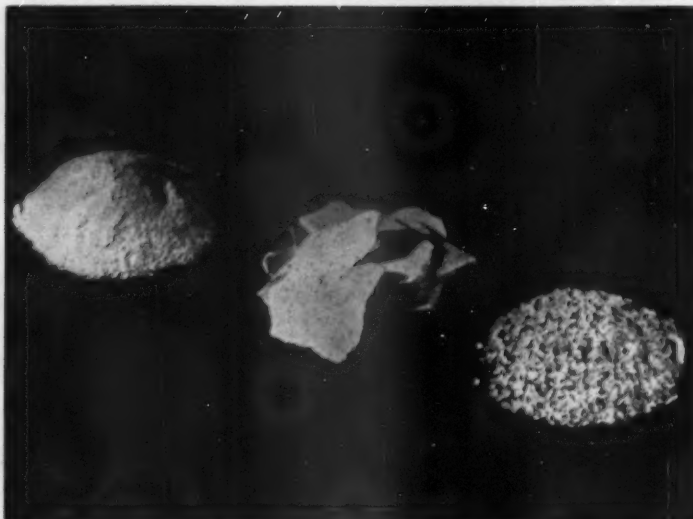
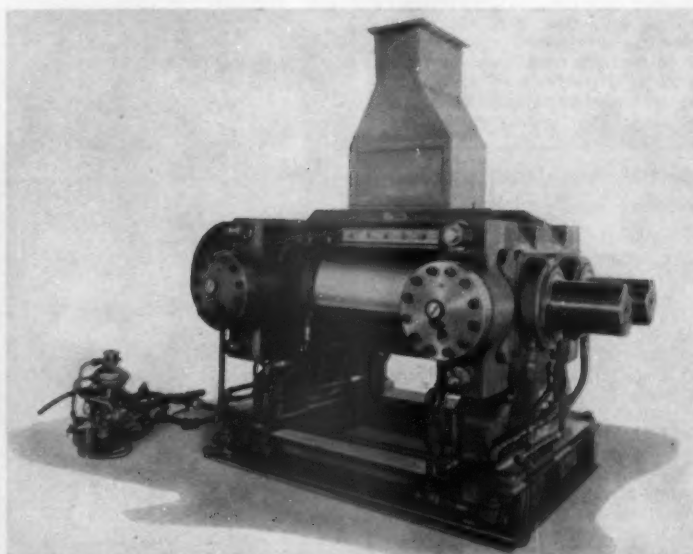
the method to production of blended fertilizers.

The company describes its system as comprising basically agglomerating fines by rolling them into a solid ribbon for subsequent granulation to desired particle size.

"While flows may vary according to raw materials feed size, preheating requirements, moisture and curing requirements, compacting process



COMPACTING PROCESS FLOW



COMPACTING SYSTEM—Allis-Chalmers' system of compacting fertilizers is shown here. Above: flow diagram of process. Center photo: compacting mill, showing hydraulic adjusting cylinders connected to pneumatic-hydraulic power unit. Lower photo: compacted salt from fines; 1. Minus 30-mesh fines; 2. compacted salt flakes; 3. granules salt-screened at 10-mesh. Up to 90% recovered as plus 10-mesh product, Allis-Chalmers claims.

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flow is most often a closed-circuit arrangement between compactor mill, granulating mill and screen," the makers state.

They add that commercial operations have shown the end product to be acceptable, possessing free-flowing properties and is granular, with close control of product size, shape and density. "Packing of fines is eliminated at the fertilizer application stage and no segregation of fines occurs," A-C says. It points out that this is an advantage for producers of blended fertilizers desiring a completely homogeneous product that will not degrade nor segregate by ingredient.

Allis-Chalmers says that typical commercial operations range from plants operating at about 2½ tons an hour to about 15 tons an hour capacity, depending upon feed material, machine size, and operating variables.

Scientists Blast Prohibitions of Delaney Proposal

LAFAYETTE, IND.—Speakers at the April 5 symposium on residues at the National Institute of Animal Agriculture held at Purdue University, voiced strong opposition to the "unscientific" aspects of the Delaney amendment.

Thomas P. Carney, vice president, Eli Lilly & Co., Indianapolis, pointed out that this law proposes a "flat prohibition against the use of substances that can be made to produce cancer when ingested by man or animals, no matter if the dosage is a million times the intended dosage in man, or if other experimental conditions are totally unrelated to the actual use of the substance in our society." Continuing, he said:

"With the experience we have already had under the Delaney amendment in the food additive act it has become apparent that conditions neither predicted nor intended by its proponents have resulted from its passage. The quandaries and the undesirable effect will only increase unless a more scientific approach is adopted.

"In any discussion of the food additives problem today it is extremely difficult to separate the objective appraisal from the purely emotional reaction. This is particularly true when the word 'cancer' is mentioned. In this case even some scientists seem to lose their sense of values. For example, one of the points under discussion in the residue problem is, as you know, whether or not a threshold level can be set for some of the chemicals. In other words, is there a level of use below which a drug is safe, and above which it is dangerous?"

"When we come to discuss this problem as related to carcinogens, to materials that produce cancer in animals, the discussion becomes pretty wild. Recently one of the very good people in the field of cancer research published a paper showing the effects of a hydrocarbon when injected into mice at various concentrations. It was, in my opinion, a beautiful experiment. Eleven different concentrations of the chemical were used on hundreds of animals. The animals were observed for their entire life span. At the two lowest concentrations no tumors appeared during the life of the animal. However, at the upper nine concentrations tumors did appear. Furthermore, as the concentration increased more tumors appeared, and in a shorter period of time. It appeared to me as though this fits into the classical definition of a 'threshold' level. However, even with this evidence, the author did not admit a threshold level. Here is his conclusion, and I quote exactly:

"The reason why extremely small

doses produced no cancer is not that there is a threshold dose but because the necessary induction time becomes longer than the total life span."

"In other words if the man or animal lived long enough and didn't die of anything else he would die of cancer. I can't get very excited about a chemical that is going to cause me to get cancer fifty years after I am dead.

"It seems to me that some of the same kind of thinking is being done by those unfamiliar either with the scientific aspects or the operational aspects of the Delaney amendment."

Discussing the role of agricultural chemicals in the light of residues, he termed it "inconceivable" that it should be necessary to justify the use of chemicals in agriculture. "Yet," he said, "only recently, it was suggested that removing these products from the market would serve two purposes: (1) prevent people from get-

ting cancer, and (2) solve the surplus food problem.

"I would certainly agree that the food surplus would vanish—very rapidly.

"I doubt if many people would seriously argue for removal of all chemicals from agricultural production, but I believe it would be useful to think about the dramatic impact that chemicals have had upon our farm economy and its ability to meet the needs of a rapidly growing population.

"I think we can attribute increased efficiency in agriculture mainly to three things: (1) mechanization, (2) development of improved strains of crops and animals, and (3) use of chemicals. It has been estimated that about 40 to 50 percent of the increase in United States agricultural production since World War II has been due to chemicals."

George L. Oppel Named Production Department Head

LOS ANGELES—Appointment of George L. Oppel as director of production for U.S. Borax & Chemical Corp. has been announced by Robert T. Edgar, vice president in charge of the production department.

Mr. Oppel, who will be headquartered in Los Angeles, was associated with American Cyanamid Co. from 1947 until recently except for two years spent with Greer Engineering Associates, Montclair, N.J., as general manager and director. His latest position with American Cyanamid was as manager of manufacturing of the agricultural division in New York.

He is a graduate of New York University, having received a bachelor of science degree in management and industrial relations.

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PRODUCTION

EDITION

Editorial

Pesticides Save Trees

SOMEHOW THE PLAINT that DDT and other insecticides are killing off birds right and left fails to ring true to most people in the pesticide trade. Particularly when these "bird lovers" condemn the use of pesticides for control of Dutch elm disease. We can't help wondering how far ahead these bird lovers have projected their logic in wanting to halt the only means found thus far to halt this tree destroyer.

Community after community has seen the results of Dutch elm disease, with ugly stump-lined streets where formerly graceful elms shaded the lawns and avenues. Yet, there are still many, apparently, who cry "foul" whenever the prospect is seen for the application of pesticides to save the birds' nesting places.

A recent such outburst was heard in Wisconsin where researchers claim that DDT used to control Dutch elm disease is a "trap for birds." They reported heavy casualties among the feathered creatures, stating that from 69% to 98% fewer nesting robins were found in areas treated with insecticides. Even when the sprays were applied in the dormant season, a heavy toll was taken, the men claimed.

This report appears to be somewhat in variance with the experience of many eastern communities where tree disease control programs have been in effect for as long as twenty years.

Pesticide manufacturers should be watchful for the introduction of similar propaganda in their communities. It seems to be open season on manufacturers of all kinds of chemical products, particularly those having to do with the control of insects.

Happily, there are some strong voices being heard on the other side of the question, too. Our only wish is that some of the good sense and objective appraisal of many entomologists and other scientists could penetrate the consciousness of those who are speaking out so recklessly against pesticides.

People like Dr. George C. Decker, for instance. In a recent talk before the Farm and Home Festival at the University of Illinois where he is an entomologist, Dr. Decker reminded his audience that a national ban on pesticides could shatter the nation's economy and reduce American farmers to the status of those in underdeveloped countries.

He told the group, most of which were farmers, that the average citizen of the U.S. takes his bountiful food supply for granted. "Few Americans realize the important role played by pesticides and other chemicals in maintaining our high standard of living. If the use of agricultural chemicals were banned tomorrow, the yield of many crops would be reduced from 10% to 90%. The price of most food items sold in stores would double, some would treble, while still others, notably fruits and vegetables, would totally disappear from the open markets."

Probably most people do not know that cultivated crops grown in North America are attacked by over 3,000 economically important species of insects, by as many plant diseases, and by unestimated numbers of nematodes, rodents and weeds.

Nor do these pesticide detractors stop to remember that destruction caused by agricultural pests ranges between \$8 billion and \$15 billion each year . . . representing a quarter of our annual production. And this despite the widespread use of the best control practices now available.

So we should allow elm trees to die to help the birds, and cut out use of pesticides in agriculture to have better crops?

Despite all the yappings of the fearful, pesticides are here to stay and their makers, though harassed, will continue to produce the best materials possible.

Weather Hampers Output

JUST ASK ANY plant manager this spring what his biggest problem is and he probably won't start talking about difficulties of granulation, ammoniation, or bagging. He is more likely to point to his bulging storage place, then remark about the heavy snows, problems caused by floods from melting snow, and the resultant lateness in fertilizer movement from the plant. "The farmers can't get into their fields . . . and they can't apply fertilizer as they should at this time of year," the manager is likely to observe.

Plants in the major portions of the U.S. are faced with storage problems unlike anything they have seen for many years. Unprecedented snows blanketed large areas of states where such precipitation has been almost unknown in the past; and in the midwest, the depth of drifts and persistency of snowfall late into the season have conspired to halt nearly all normal agricultural activity . . . mainly that of applying fertilizers.

A recent gathering of fertilizer plant executives at the headquarters of International Minerals & Chemical Corp. pointed up the problem. All said they were having trouble finding adequate storage space, and some indicated that they would have to cut down production even though they realized that it would mean shortages later.

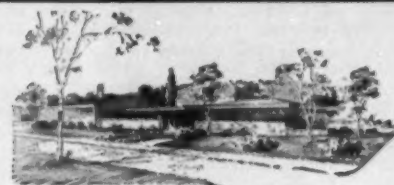
Finding an answer to this situation is not easy, since additional storage space is expensive to build and maintain, particularly when it may not be absolutely necessary to have some years.

Some leaders in the trade are seeking better distribution methods, but until these are found, manufacturers will be faced each spring with the possibility of a repeat of this year's difficulty.

Five-Year Safety Record

A SPECIAL TOOT of the factory whistle recently at the plant of Niagara Brand Chemicals, Burlington, Ont., was a significant one. It signaled the end of five full years of operation without a single lost time accident. The record was actually more than one for the plant itself, but included office personnel, field representatives and sales staff as well. It represented some 500,000 hours of work.

It seems that more and more safety records are being posted these days in both fertilizer and pesticide plants around the country. This is all for the good. It is noteworthy, however, that it is only those plants where safety considerations are taken seriously, that such records seem to be achieved.



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CROPLIFE is a controlled circulation journal published weekly. Weekly distribution of each issue is made to the fertilizer manufacturers, pesticide formulators and basic chemical manufacturers. In addition, the dealer-distributor-farm adviser segment of the agricultural chemical industry is covered on a regional (crop area) basis with a mailing schedule which covers consecutively, one each week, three geographic regions (South, Midwest and West) of the U.S. On the fourth week, production personnel in fertilizer manufacturing and pesticide formulating plants throughout the U.S. are covered in depth. To those not eligible for this controlled distribution, Croplife's subscription rate is \$5 for one year (\$6 a year outside the U.S.). Single copy price 15¢.

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Donald Neth, Managing Editor

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Richardson Scale Combines Areas, Names Manager

CLIFTON, N.J.—The combining of its Upper New York state and Buffalo districts to form a larger area, to be known as the New York District, has been announced here by Richardson Scale Co., engineer and manufacturer of automatic weighing and proportioning equipment and controls.

It was further announced that Kenneth Kardux, for the last two years responsible for the Upper New York State district, is to manage the expanded territory. Mr. Kardux was formerly a New Jersey office sales engineer and prior to that served as a design engineer.



Kenneth Kardux

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Industry Meetings

April 11-12—Annual California Fertilizer Conference, Fresno State College, Fresno, Cal.

June 13-15—National Plant Food Institute annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 21-22—Annual meeting, Southern Feed & Fertilizer Control Officials, Riverside Hotel, Gatlinburg, Tenn.

July 13-15—Eleventh annual Fertilizer Conference of the Pacific Northwest, Hotel Utah, Salt Lake City, B. R. Bertramson, State College of Washington, Pullman, Wash., chairman.

July 27-29—Great Plains Agricultural Council, 1960 meeting, Laramie, Wyo.

July 27-30—Southwest Fertilizer Conference and Grade Hearing, Galveston Hotel, Galveston, Texas.

Sept. 24-26 — Western Agricultural Chemicals Assn. 31st annual meeting, Palm Springs Riviera Hotel, Palm Springs, Cal.

Sept. 29-30 — Northeast Fertilizer Conference, Hotel Hershey, Hershey, Pa.

Oct. 5-6—Southeast Fertilizer Conference, Atlanta Biltmore Hotel, Atlanta, Ga.

Oct. 17-21—National Safety Congress, 48th annual meeting, Fertilizer Section meets at La Salle Hotel, Chicago.

Nov. 13-15—California Fertilizer Assn., 37th annual meeting, del Coronado Hotel, Coronado, Cal.

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FOOD MACHINERY & Chemical Corp. has completed its new chemical research and development center at Princeton, N.J., announced Dr. Carl F. Prutton, executive vice president. The center houses inorganic product application and sales service groups formerly associated with the company's Becco Chemical, Chlor-Alkali and Mineral Products Division. The center has specially designed pilot scale areas for extended studies in a number of fields.

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